

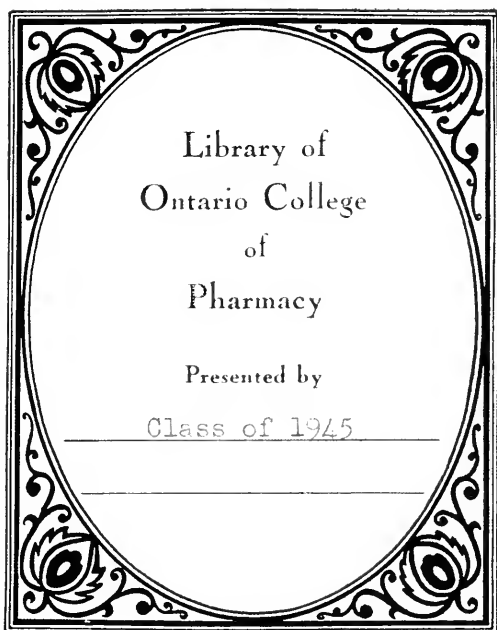


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REMARKS ON THE PREPARATION OF LIQUOR BISMUTHI.

BY ALBERT E. EBERT.

This subject was introduced by Mr. C. R. C. Tichborne, (Lond. Pharm. Journ., Jan. 1864,) and was thoroughly investigated some months later by Mr. N. Gray Bartlett, who communicated the results of his examination to this Journal (Jan., 1865.) Since the appearance of the latter paper an article was published by Mr. Thos. P. Blunt, (Lond. Pharm. Journ., May, 1865) in which Mr. Bartlett's process was declared unsatisfactory, though at the same time a formula was submitted which, in all essential points, was but a reproduction of that of Mr. Bartlett. Subsequently, a rejoinder, by Mr. Tichborne, appeared, (Lond. Pharm. Journ., June, 1865) reiterating his former statements, which had been disputed, and suggesting another method of preparing liquor bismuthi. This consisted in dissolving crystallized ter-nitrate of bismuth in water, adding a due proportion of citric acid, and neutrallizing the liquid with ammonia. These papers, instead of further elucidating the subject, have left it in such a state of uncertainty, that many may be deterred from attempting the preparation of liquor bismuthi.

The large demand which has followed the introduction of this solution, and the evidences of favor with which it has been received, convince me that it is of too much value to be allowed to fall into discredit through fallacious formulas or the disputes of inventors.

After a series of carefully conducted experiments with the different processes, I have arrived at the following conclusions:

*First.* Teroxide of bismuth, though recently precipitated,

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but sparingly soluble in citrate of ammonia, even at the boiling temperature. The presence of a portion of nitrate of ammonia, through insufficient washing of the teroxide, will effect a solution.

*Secondly.* A neutral solution of citrate of bismuth, obtained by means of citrate of ammonia and ammonia, or by ammonia alone, of such strength that a fluid drachm contains one grain of teroxide of bismuth, is prone to decomposition. This change is not attended by the deposition of a basic salt, but by the formation of humus: the liquid acquiring, meanwhile, a disagreeable smell and taste, which totally unfit it for use.

This is prevented by the addition of alcohol, whereby it is preserved indefinitely. A concentrated solution appears to keep well without this addition of spirit.

*Thirdly.* Mr. Blunt's assertion that, by Mr. Bartlett's process, a large loss of citrate of bismuth is incurred, is erroneous, and must have arisen from the employment of nitric acid, sp. gr. 1.5, (Ph. Br.) instead of that of the sp. gr. 1.42, (U. S. Ph.) Another inaccuracy occurs in the direction, to "add solution of potassa until the mixture is only faintly acid;" before this point of saturation is reached, the precipitate, first formed, will be entirely redissolved. When only sufficient potassa is added to neutralize the nitric acid, the citrate of bismuth is precipitated; an excess of the alkali over this quantity *dissolves* the citrate of bismuth, the solution still having an *acid* reaction. Even when the potassa is employed in atomic proportions the yield of citrate of bismuth is *no larger* than is obtained by precipitation with citrate of potassa. The process recently suggested by Mr. Tichborne (before alluded to) I consider highly objectionable, because of the presence of nitrate of ammonia. A little more than one grain of the latter salt being administered with every grain of teroxide of bismuth: such an addition could scarcely fail to interfere injuriously with the therapeutical action of the bismuth. Though I have employed Mr. Bartlett's process many times, and with uniform success, I prefer a modification of it, embodying the idea of Mr. Blunt, i. e., in dissolving the citric acid in the solution of nitrate of bismuth, and adding a sufficient quantity of potassa to exactly saturate the nitric acid employed. The ad-

vantage being that the citrate of bismuth thereby produced is more readily washed, and is more rapidly and completely dissolved by ammonia.

The process is as follows :

Take of Subcarbonate of bismuth a troyounce ;

Citric acid (in powder) 420 grains ;

Nitric acid, sp. gr. 1.42, a troyounce and a half ;

Pure caustic potassa 450 grains ;

Distilled water,

Alcohol, each, a sufficient quantity.

Dissolve, by gradual addition, the subcarbonate of bismuth in the nitric acid, and, when effervescence has ceased, dilute the solution with a fluidounce and a half of distilled water ; now add the citric acid, and stir until it is dissolved. In eight fluidounces of distilled water dissolve the caustic potassa, and add this gradually to the acid solution. Permit the mixture to stand for six or eight hours, then transfer to a moistened paper filter, and wash the precipitate until the washings no longer contain nitrate of potassa. Transfer the still moist magma to a dish, and add, very gradually, water of ammonia until the precipitate is dissolved, and a neutral solution is obtained. Dilute this solution with an equal volume of distilled water, and treat half a fluidounce of the liquid with hydrosulphate of ammonia, in slight excess ; wash the precipitate on a tarred filter, dry on a water bath and weigh. Multiply the weight of the sulphide of bismuth by the fraction  $\cdot 908$ , to determine its equivalent in teroxide of bismuth. Apply the same ratio to the remainder of the liquid, and dilute it to such an extent that a fluid drachm shall contain one grain of teroxide of bismuth, seven-eighths of which measure must be made up with distilled water, and the remainder with alcohol. The average product of liquor bismuthi, from a troyounce of subcarbonate of bismuth, was 50 fluidounces, indicating a loss of bismuth amounting to 7.6 per cent.

This loss is occasioned by the slight solubility of citrate of bismuth in the washings, and though this portion may be recovered, it is too small in amount to compensate for the time and trouble necessarily expended in its separation.

*Chicago, December, 1865.*

## ON THE ACTIVE PRINCIPLE OF RHUS TOXICODENDRON.

By JOHN M. MAISCH.

Notwithstanding the poisonous qualities of *Rhus Toxicodendron* have been known for a long time, it was not until the year 1857 that an analysis of its constituents were made by Dr. Joseph Khittel, which was published in Wittstein's *Vierteljahresschrift*, vii. 348-359. A condensed translation of this paper appeared in the *American Journal of Pharmacy*, 1858, p. 542-544. According to this author, the activity of the leaves of the poison oak depend on a volatile alkaloid, which he obtained by distilling the concentrated infusion of the powdered leaves with caustic potassa, neutralizing the distillate with sulphuric acid, evaporating the liquid, and treating the residue with a mixture of equal quantities of ether and alcohol, whereby sulphate of ammonia was left behind; the ethereo-alcoholic solution was evaporated spontaneously, distilled with caustic potassa, and an alkaline liquid obtained, which could be neutralized with hydrochloric acid, and then yielded a precipitate with chloride of platinum.

Since that time, I have not met with another investigation.

I may as well state at the outset, that my results are entirely at variance with those of Dr. Khittel; and it may, therefore, not be out of place to criticise the above process now.

It is well known that the *exhalations* of *Rhus Toxicodendron* exert a poisonous influence on the human body; the poisonous principle must, therefore, be volatile, and, at the same time, be naturally in such a loose state of combination as to be continually eliminated and separated with the usual products of vegetable exhalations. It is natural to suppose that, during the process of drying, the greatest portion of the poisonous principle should be lost. This loss must be still greater, if the dried leaves are powdered, a hot infusion prepared from them, and this infusion evaporated down to the original weight of the dried leaves. It is obvious that Dr. Khittel could not have selected a better method for obtaining the least possible quantity of the poisonous principle, if, indeed, it could be obtained by this process at all.

The Association being desirous to know by what method the activity of these leaves can best be preserved, I accepted the question, and commenced my experiments in 1864, basing them upon the results obtained by the author before mentioned. I may state here, that I have frequently collected the leaves, flowers, and fruit of *Rhus Toxicodendron*, and its variety, *radicans*, without ever experiencing any ill effects. I have handled all parts of the plant with perfect impunity, and have even spread the juice over my hands, without feeling more than a slight itching upon the upper side of the hand, which immediately disappeared on washing the hands with water. In a word, I considered myself so little subject to its influence, that I collected the leaves for all the following experiments myself; and on one occasion, on the hills of the Wissahickon, laid down in the midst of a beautiful specimen of *Rhus Toxicodendron* var. *radicans*, which spread so prolifically over shrubs and trees, and through the grass beneath, that I was on all sides surrounded by its branches, leaves, and flowers; although remaining in this position for over fifteen minutes, selecting the most vigorous leaves, I escaped with no other effects than those described before, which yielded at once to ablutions with the water of this little stream.

I could hardly expect to try the efficacy of the poisonous principle, when isolated, upon my own person; the result, however, proved to be very different.

But to return to the experiments: I immersed  $8\frac{3}{4}$  ounces of the leaves of the true *Rhus Toxicodendron* in alcohol in sufficient quantity to cover it, and added enough sulphuric acid to produce a strong acid reaction, in order to combine all the alkaloid. The vessel was set aside for about nine months, the alcohol then spontaneously evaporated, the residue forcibly expressed, mixed with a little water, and again expressed, and the united liquids distilled with an excess of lime. I selected this base, because from its sparing solubility, it might be expected to act less energetically in inducing decomposition than potassa. The alkaline distillate, when collected by itself, reminded forcibly of the odor generated by decoctions of hemlock and henbane. The alkali was collected in an excess of

dilute hydrochloric acid, and this solution had the same odor. It appeared most likely, from this experiment, that the odor was entirely distinct from the alkaline reaction, or, in other words, that the odorous compound and the alkali were two different bodies.

The solution had still an acid reaction from the excess of hydrochloric acid employed when the distillation was stopped. The liquid was now evaporated to dryness, in a current of dry air at a temperature of about 120° F., and yielded a considerable amount of a crystalline residue, to which the same odor still adhered to a certain degree. This crystalline mass now must contain the volatile alkaloid of Dr. Khittel.

A portion of it was dissolved in distilled water; the reaction of the solution was neutral to litmus paper. Tested with Sonnenschein's phospho-molybdic acid, a light-yellow precipitate was obtained, which yielded with potassa the odor of ammonia only; with Mayer's iodo-hydrargyrate of potassium in acidulated solution, no precipitate was produced; on adding potassa, an orange-brown precipitate occurred; tannic acid yielded no precipitate; neither did iodine; all the reactions proved the presence of ammonia only. A portion of the crystalline mass was now taken up by dilute sulphuric acid, again evaporated to near dryness, the residue almost neutralized by potassa, mixed with three times its bulk of 95 per cent. alcohol, and the same quantity of ether, and, after standing over night, filtered. The ethereal liquid was evaporated spontaneously, and left a minute residue, which, on being treated with potassa and heated, gave not the slightest evidence of an alkaline reaction; but phospho-molybdic acid appeared to create a very faint turbidity.

It was possible now, that, by the long maceration of the leaves with sulphuric acid and alcohol, the alkaloid was decomposed. To ascertain this, twelve ounces of fresh leaves were collected, infused in cold water, expressed, and, after a second maceration, again expressed. The liquid was again distilled with caustic lime, and the distillate collected in dilute sulphuric acid. After spontaneous evaporation in a current of warm air, as before, the residue was carefully neutralized with



bicarbonate of potassa, and treated with alcohol and ether with precisely the same results as stated above; it is not impossible that large quantities of a mixture of alcohol and ether will dissolve minute traces of sulphate of ammonia.

It was evident now that our *Rhus Toxicodendron* does not contain any volatile alkaloid.

Another lot of vigorous leaves was now collected, enclosed in a tin box, and a number of moistened test papers introduced. The next morning, it was observed that the curcuma and red litmus papers were unaffected, but that the blue litmus papers had been colored strongly red. This single experiment was at once a conclusive proof that the exhalations of these leaves contained a volatile acid, and that the poisonous properties were most likely due to it.

These leaves were now bruised with six per cent. of their weight of slaked lime, and, after maceration with a sufficient quantity of water, expressed, again macerated and expressed, and the liquor reserved for a few days for further investigation.

In the meantime, the residue in the retort from the previous lot was mixed with sufficient sulphuric acid to impart a strongly acid reaction, and then subjected to distillation, the distillate being collected in water containing carbonate of baryta in suspension. *This distillate had nearly the same odor as the distillate obtained by lime*, and the conclusion arrived at before, that the odorous compound was a distinct body, was thereby verified. The distillation was soon stopped, because this product was merely intended for experiments, and to ascertain whether the previous continued heating with lime, had produced a change in the acid or not. During this process, a slight eruption appeared above the wrists on both my arms, but was ascribed to the extremely hot weather. It was treated with subacetate of lead, and no further notice taken of it.

The solution of the baryta salt, thus obtained, was tested with various reagents: nitrate of silver produced a slight milkiness, removable by nitric acid; on standing, a copious black precipitate was obtained; bichloride of mercury, after some time, produced a white precipitate, then supposed to be calomel; bichloride of platinum an extremely slight deposit;

chloride of gold, after boiling, a separation of metallic gold adhering to the test tube; acetate of lead, a white precipitate, soluble in nitric acid; neutral tersulphate of iron, (I had then no neutral sesquichloride of iron on hand,) a precipitate of sulphate of baryta, and apparently a slight red coloration.

These reactions appeared to be so nearly identical with those of formic acid, that I was almost satisfied that the dreaded poison of the *Rhus Toxicodendron* was the same compound which is generated by the little busy *Formica rufa*.

The expressed liquid, set aside as before stated, was now subjected to distillation, after having been previously mixed with an excess of sulphuric acid. A portion of the distillate was again collected in water, holding carbonate of baryta in suspension; another quantity was condensed by itself, to obtain the pure acid. This acid had a similar odor, as noticed before, but it changed and disappeared almost entirely on rectifying the liquid over chloride of calcium.

The acid solution, as thus obtained, is colorless, strongly affects blue litmus paper, and neutralizes bases; but the salts with the stronger bases show a distinct alkaline reaction. Added to solution of *acetate* or *subacetate of lead*, the acid produces a heavy white precipitate, which is scarcely soluble in boiling water, but readily soluble in nitric acid; with *corrosive sublimate* and *bichloride of platinum* no alteration takes place even after boiling; *chloride of gold* is in the cold slowly, at the boiling heat rapidly, reduced, and a film of metallic gold deposited; with *nitrate of silver*, no immediate alteration occurred in the cold, but gradually a black precipitate of oxide of silver takes place, which is produced in a few minutes, if the mixture is boiled. This separation of the oxide of silver must be caused by the mutual decomposition of the acids, whereby the oxide is liberated; for, if the acid is boiled with pure oxide of silver, and the solution filtered while hot, it retains the silver in solution. A salt of the new acid produces, in nitrate of silver, a white turbidity, changing to a black precipitate, on standing, or, in a few minutes, on boiling; but entirely removable by the addition of nitric acid.

*Protonitrate of mercury* is not affected by the pure acid,

either in the cold or on boiling; but treated with the solution of a salt of the new acid, a white precipitate is produced, which gradually, but, on boiling, instantly changes black; nitric acid dissolves it readily.

*Red oxide of mercury* is dissolved by the boiling acid; the solution, filtered while hot, deposits, on cooling, nearly all the salt, leaving, however, enough in solution to affect hydrosulphuric acid considerably. This white mercuric salt is the same as the white precipitate occurring in solutions of a salt of the new acid with bichloride of mercury, and it is not reduced either on standing or by boiling.

*Protoxide of lead* is readily taken up by the boiling acid, forming a solution of a strong alkaline reaction, which, on cooling, precipitates most of the salt in white flocks, leaving the liquid decidedly alkaline; the salt is taken up by dilute nitric acid.

✓ *Carbonate of copper* dissolves in the boiling acid to a bluish green solution, which forms no precipitate on cooling.

✓ *Neutral sesquichloride of iron* is not affected in color, either by the pure acid, or by one of its salts.

✓ *Permanganate of potassa* is readily reduced.

✓ *Chromate of potassa* is not reduced to chromic oxide, on boiling, either with the free acid or one of its salts.

Comparing all these reactions with those of formic acid, it will be seen that only the behaviour to chloride of gold, and the reduction of metallic gold from the solution are identical; in the sparing solubility of the lead salt, the two acids likewise resemble each other. This acid has more reactions in common with acetic acid, among the most prominent of which are the slight alkaline reaction of their salts with alkalies and alkaline earths, and the strong alkaline reaction of the (basic?) lead salt.

● But the behaviour of this acid and its salts to oxide of silver, nitrate of silver, oxide of mercury, and corrosive sublimate, distinguish it readily from both formic and acetic acid.

Taking all the reactions together, it is, unquestionably, a new organic acid, for which I propose the name of *Toxicodendric acid*.

That it is the principle to which the poison oak owes its effects on the human system, was proved to my entire satisfaction by the copious eruption and the formation of numerous vesicles on the back of my hand, on the fingers, wrists, and bare arms, while I was distilling and operating with it. Several persons, coming into the room while I was engaged with it, were more or less poisoned by the vapors diffused in the room; and I even transferred the poisonous effects to some other persons, merely by shaking hands with them.

The dilute acid, as obtained by me, and stronger solutions of its salts, were applied to several persons, and eruptions were produced in several instances, probably by the former, though not always, which was most likely owing to the dilute state of the acid. Whenever this was boiled, I always felt the same itching sensation in the face, and on the bare arms, which I experience on continual exposure of my hands to the juice of the plant.

As remedies against it, I have tried subacetate of lead, permanganate of potassa and ammonia, the last, I believe, with the best success. Alkaline solutions were first recommended by Prof. Procter, I believe, and, as my experiments show, they are the remedies which, *à priori*, might be expected to afford the greatest relief, just as in the case of formic acid. The eruption produced by this acid is very similar in its nature to the one produced by toxicodendric acid, and its effects yield readily to alkaline lotions. It is not unlikely that, like the formiates, the toxicodendrates are without any ill effects, if applied externally. The reactions of our new acid show, likewise, the reason why permanganate of potassa, subacetate and even acetate of lead may be valuable remedies for this eruption. While the former completely decomposes it, the last named salts produce nearly insoluble precipitates with it; at least, toxicodendric appears to be stronger in its affinities than acetic acid.

The question may now be asked, how Dr. Khittel, in his otherwise carefully performed analysis, could overlook such an important constituent? The answer is partly given in the remarks previously made; the drying and powdering of the

leaves must expel a great portion of the volatile poison ; but in the course of his analysis, he has removed it from the ethereal liquid by distillation and evaporation with water, and if any should have been left in the then resulting aqueous solution, it was precipitated by sugar of lead, and may have been regarded as phosphoric acid, or may have been mixed with the peculiar tannate of lead.

Not having the original paper at hand, I cannot positively speak on this point, or on the method employed which satisfied him at the start that the plant contained a volatile alkaloid. But I must reiterate that, by his method, I could not obtain it. The juice, however, contains notable quantities of ammonia salt, which are not only shown on the distillation with potassa or lime.

If the juice is expressed with the previous addition of a little water to the leaves, and then more acidulated with nitric acid, phospho-molybdic acid produces a yellow precipitate which was treated with soda, the distillate neutralized by sulphuric acid, and, after evaporation, treated with alcohol and ether ; the residue from their evaporation was minute, and no alkaline reaction of the vapors, when treated with a fixed alkali, could be observed ; but the acidulated solution yielded a faint turbidity with phospho-molybdic acid ; none with iodohydrargyrate of potassium.

The expressed and acidulated juice gave no reaction with Mayer's test, except after rendering it alkaline by potassa, the behaviour of ammonia.

The residue in the retort, after the distillation of toxicodendric acid, behaved exactly like the juice. The excess of sulphuric acid was removed by neutralizing with bicarbonate of potassa, mixing with twice its bulk of strong alcohol, and distilling the alcohol from the filtrate, when it was tested with both Sonnenschein's and Mayer's reagents with the same results.

The question which I accepted is only partially answered ; I have merely proved that the poisonous properties of *Rhus Toxicodendron* do not reside in a volatile alkaloid, but that they are due to a volatile acid. If I state that the dried leaves

do not contain a trace of the volatile alkaloid, it is only what might have been expected; but then it was not dissipated; it merely did not exist there previously.

But whether the toxicodendric acid is, to greater or less extent, lost in drying, I am as yet unable to say; though such a result may be expected. As regards its isolation, it is easily effected. The only questions are whether it could be procured in sufficiently large proportion to be remunerative, whether it is not altered by keeping in its pure state, and whether it possesses any intrinsic value in its medicinal properties. As far as our knowledge reaches, I believe the expressed juice, preserved by alcohol, to be the best pharmaceutical preparation.

Even in the chemical history of this acid, nearly everything is to be found out yet by further researches. If my time permits, I may attempt to prepare it in larger quantities, and in a more concentrated form, and to determine its composition.—*Proc. Amer. Pharm. Association*, 1865.

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## ON AN ANTIDOTE AT ONCE FOR PRUSSIC ACID, ANTIMONY, AND ARSENIC.

By T. AND H. SMITH, OF EDINBURGH.

[In 1854, Messrs. T. and H. Smith suggested the use of proto-persulphate of iron in connection with an excess of alkaline carbonate, as an antidote for prussic acid, based on experiments made on dogs. The difficulty has always been that the time required to prepare the antidote was too great, in view of the energy of the poison, and its rapid action. In this country it has for many years been the custom with some druggists to keep a solution of persulphate of iron ready for use with ammonia, for producing hydrated sesqui-oxide of iron.

In the "Pharmaceutical Journal" for October these gentlemen have a very long and elaborate paper on this subject, under the above title, in which they take advantage of the officinal (British) solution of perchloride of iron as the source of the hydrated sesqui-oxide, and appear to consider it superior to the solution of tersulphate usually employed as the source of sesqui-

oxide, and which is far more easily prepared and kept. This is also a preparation of the British Pharmacopœia.

The action of this antidote for prussic acid is based on its capability of instantly forming Prussian blue with that acid. When the antidote is used, the solution of carbonate of soda is first swallowed, and immediately afterwards the mixture of sesquichloride and protosulphate of iron, so that a mixture of sesqui- and protoxide of iron in a nascent gelatinous state is formed in the stomach, and this renders the poison inert, by forming Prussian blue. Owing to the fact that carbonic acid is eliminated in the use of the alkaline carbonate, and that this acid interferes with the action of the test, a large excess of the antidote is considered necessary by MM. Smith to insure its activity.

“When the poisoning has been caused by cyanide of potassium, in which the prussic acid is, as it were, united to a base, the alkaline solution forming one part of the antidote does not of course require to be given, although the antidotal action would not be prevented by giving it in the way recommended.”

A considerable portion of the paper is taken up with discussing the preparation and action of hydrated sesqui-oxide of iron as an antidote to arsenious acid, embodying the facts that were examined twenty years ago in this country and in Germany, and which are noticed in the 14th and 25th volumes of this Journal, and which was noticed in the 2d volume of the “Pharmaceutical Journal.” The numerous instances in which the hydrated oxide have been successfully employed in the United States have caused it to be much relied upon here, where the poison has not been too long ingested.

The Messrs. Smith have extended their experiments to tartar emetic, and find the sesqui-oxide to act equally well as an antidote; the sequel will show their results. It seems needless to recommend the solution of sesqui-chloride of iron for the purposes mentioned, when the tersulphate of sesqui-oxide of the Pharmacopœia is more easily prepared, cheaper, and contained in both the British and U. S. Pharmacopœias,—and especially as one part of Smith’s antidote is protosulphate of iron, which of course gives a resulting sulphate of soda. Our experience with hydrated oxide is greatly in favor of ammonia, which is always ready, can

be added till in slight excess with certainty, as its odor detects an excess instantly, and Bunsen and others have shown that a slight excess of ammonia is advantageous. In order to render the following recipes for antidotes intelligible to the American pharmacist, we will state that one three-fourths drachms of our officinal solution of tersulphate of iron is equal to one drachm of the solution of perchloride of the British Pharmacopœia, used in the recipes. We also insert a supplement to the MM. Smiths' paper, from the "Pharmaceutical Journal" for November, modifying the prussic acid test.—ED. AM. J. PH.]

While engaged in these experiments on the antidotal action of hydrated oxide of iron on the poisonous effects of arsenic, the remarkable case of Dr. Pritchard had just occurred; and it at once occurred to us that there was a great likelihood, principally from the many chemical relations of antimony to arsenic, that the hydrated oxide of iron might also be an antidote to the poisonous action of antimony.

A few experiments soon confirmed, in the fullest manner, our anticipations. A mixture of solution of perchloride of iron, containing eighty grains of anhydrous peroxide of iron and a solution of one ounce avoirdupois of crystallized carbonate of soda, was prepared; to this mixture, containing hydrated peroxide of iron and chloride of sodium, was added a solution of ten grains of tartar emetic: the whole was thoroughly agitated, and thrown on a filter. The filtered liquid, acidulated with muriatic acid, was tested with sulphuretted hydrogen for antimony, but not a trace was found. The filter, with its contents, was then mixed with other ten grains of tartar emetic, which were again removed by the oxide of iron. A third quantity of tartar emetic added was almost entirely removed, so that eighty grains of hydrated peroxide of iron absorb nearly thirty grains of tartar emetic from solution.

The absorbing action of hydrated oxide of iron towards antimony would be still more striking but for the dissolving power of the tartaric acid, set free, upon the peroxide of iron. That the oxide of iron does not merely act by taking the organic acid and precipitating the oxide of antimony in an insoluble state, is



shown by using hydrate of magnesia instead. In this case, even with a much smaller quantity of tartar emetic, the filtered liquid gives antimony in abundance to the proper tests.

To be suitable for the antidotes, the liquor ferri perchloridi must answer to the following tests:—one fluid drachm must contain 15·62 grains peroxide of iron; ammonia must give a pure reddish-brown precipitate, without any shade of black; it must not smell strongly acid, nor, after slight dilution, give a brisk effervescence with a piece of zinc.

Directions proposed to be attached to each bottle of Liq. ferri Perchloridi:—

*Prussic acid antidote.*—Take of liquor of perchloride of iron thirty-seven minims, protosulphate of iron in crystals, as pure as possible, twenty-five grains; as much water as make a solution of a protosesquisalt of iron, measuring about half an ounce. Dissolve, on the other hand, seventy-seven grains crystallized carbonate of soda in about half an ounce of water. These quantities destroy the poisonous action of between 100 and 200 minims of medicinal prussic acid, officinal strength, on giving first the one liquid and then the other.

*Antidote for cyanide of potassium.*—The antidote for this compound is the same as for prussic acid, except that the solution of protosesquisalt of iron is to be used without the alkaline solution, the prussic acid being already combined with an alkali; the use of the alkali, however, would not be injurious; a harmless yellow prussiate would be formed. In this case, in consequence of the possible presence of free acid in the stomach, the alkaline liquid should be given first—the quantities given, as the prussic acid antidote would decompose thirty-five grains of cyanide of potassium.

*Antidote for arsenious acid.*—Measure out five fluid drachms and seven minims of liquor ferri perchloridi into two or three ounces of water, then add to the liquid a solution of one ounce of crystallized carbonate of soda in a few ounces of warm water, stir till effervescence ceases; the resulting mixture destroys about ten grains of arsenious acid.

*Antidote for tartar emetic.*—Mix five fluid drachms and seven minims of liquor ferri perchloridi with a few ounces of water;

mix in now a cream formed of ninety grains of calcined magnesia, rubbed up with water in a mortar, stir till, after gelatinizing, the mixture again gets thin; empty the mixture into a calico or muslin cloth, and press out the liquid; remove the mass from the cloth into a clean mortar, and rub it up with a little water into a smooth cream; in this state, it can destroy upwards of twenty grains of tartar emetic. It may also be used as an antidote for arsenious acid, of which it absorbs about ten grains.—*Lond. Pharm. Journ.*, Oct. 1, 1865.

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SUPPLEMENT TO PAPER ON AN ANTIDOTE AT ONCE FOR  
PRUSSIC ACID, ANTIMONY, AND ARSENIC.

BY MESSRS. T. AND H. SMITH.

In addition to and completion of our late remarks, in this Journal, on Sol. Ferri Perchloridi as an antidotal agent in poisoning by either prussic acid, antimony, or arsenic, it occurred to us, while our manuscript was in the compositors' hands, that the question may be asked—what effect would the not unlikely occurrence of free acid in the stomach have on the action of the prussic acid antidote when its use may be indicated? If the amount of acid could be known, the answer would be easy, viz.: the corresponding quantity of an alkali given in advance would prevent any interference with the desired action; but a quantity of alkali so great would be required to meet the most extreme case that the remedy might itself have an injurious action, or might form a soluble yellow prussiate which, although not poisonous, would be a less desirable product than the insoluble and inert Prussian blue. It therefore suggested itself to our minds that caustic magnesia might be a more desirable agent in such a case. A single trial showed that every difficulty is removed by the use of that substance, and that it does not interfere with the action of the antidote.

Ninety grains of calcined magnesia were made into a smooth cream with a little water; two drachms of muriatic acid were then added, and the acid was instantly neutralized, yet leaving a large excess of magnesia. 100 minims of medicinal prussic

acid were now added, and on now preparing to add the alkaline solution to form a cyanide, before the addition of the iron solution, it occurred to us that the excess of magnesia itself might form the cyanide necessary to the formation of the Prussian blue. Resolving, therefore, to put the idea to the test, we at once added the iron solution, and the moment contact between the two liquids occurred, the blue color showed that the formation of Prussian blue had, to a certain extent, been the result. After the addition of a solution containing  $11\frac{1}{2}$  minims of solution of perchloride of iron, and  $8\frac{1}{4}$  grains of green vitriol, muriatic acid was added till the excess of magnesia and the excess of proto-peroxide of iron had been dissolved. Prussian blue was left in abundance. On now at once filtering, and adding to the filtered liquid a few drops of a solution of persalt of iron, no Prussian blue was formed,\* showing the absence of any ferro-prussiate. On now adding aqua potassæ to neutralize the excess of acid, and throw down the iron in solution, no tinge of blue was produced, not even on adding an excess of dilute muriatic acid. The precipitate

\* When freshly-precipitated Prussian blue is rubbed up with calcined magnesia in considerable excess, after a short time, the mixture having been collected upon a filter and washed with distilled water, it will be found that almost all the Prussian blue has been converted into proto-peroxide of iron, along with a simultaneous corresponding formation of ferrocyanide of magnesium, as may be proved by the addition of a solution of a persalt of iron to the filtered liquid, whereby almost all the Prussian blue is reproduced. This reaction does not take place when an excess both of magnesia and of the iron solution is used, as in the case of the antidote; for, if the mixture of Prussian blue, proto-peroxide of iron, and magnesia thus obtained be digested for a long time with water, and that at the temperature of the living body, barely a trace of Prussian blue is produced upon the application of a solution of persalt of iron to the filtrate. In this case, the excess of iron in the form of precipitated oxide, along with the Prussian blue, appears to prevent the Prussian blue from being decomposed by the magnesia, as would occur with this substance by itself. Two explanations of this remarkable result suggest themselves; either a compound, stable towards magnesia, may be formed between the Prussian blue and the proto-peroxide of iron, or this last substance by enveloping, and thus shielding the Prussian blue from the action of the magnesia, may prevent the result that would otherwise be produced.

entirely dissolved to a clear solution. The complete absence of prussic acid was thus proved. All of it had been completely removed.

We prepared as above another quantity of magnesia emulsion mixed with prussic acid, and, after adding the iron solution, the liquid, having been filtered from the mixture, was without delay distilled, and on testing the distillate, it neither answered to the Prussian blue nor to the silver test; it contained no prussic acid.

We believe ourselves justified in now giving, as the antidote for prussic acid, magnesia and a proto-persalt of iron, thus:—Make into a smooth cream, with water, from 1 to 2 drachms of calcined magnesia. Give the emulsion to the patient, then give, in water, a solution of 16 minims of perchloride of iron, and  $12\frac{1}{2}$  grains of green vitriol. These numbers, being in excess of the theoretical quantity, were those used in our experiments. Should it be supposed that so much as 400 minims of medicinal prussic acid had been taken, of course four times the quantity of the iron compound necessary for 100 minims should be given, but without altering the quantity of magnesia.

Although calcined magnesia, *alone*, slowly dissolves in prussic acid, yet in the presence, simultaneously, of a large excess of magnesia and the solution of a proto-persalt of iron, the reciprocal action resulting in the formation of a Prussian blue, seems to be almost instantaneous.—*London Pharm. Journal*, Nov. 1, 1865.

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#### PREPARATION OF CARBOLIC (PHENIC) ACID.

BY M. MULLER.

Phenic acid or phenilic alcohol is usually accompanied by its congeners, xylic and cressylic alcohols, which adhere to it with great tenacity, and give it the property of becoming brown in contact with the air. For its purification the author has recourse to a partial neutralization, and afterwards to the fractional distillation of the product.

The crude tar cedes to soda or lime water a mixture of the matters before mentioned, as well as naphthaline, which is solu-

ble in concentrated solutions of the alkaline phenates. Water is added to this until it ceases to cause a precipitate, when the liquid is exposed in wide vessels, to facilitate the formation of the brown bodies and their deposit. After filtering, the approximative quantity of organic matter held in solution is determined; formed principally of phenic acid and its congeners, which are easily displaced by acids.

The phenic acid always is the last to separate, so that it is easy to disembarass it of its associated matter and brown oxidized products by adding carefully the proportion of acid determined by calculation, so as to precipitate at first only these matters, and by means of several trials it is easy to arrive at the proper point to stop, so as to retain the phenate nearly pure. The acid is now separated and rectified, and soon crystallizes. As a little water prevents its crystallization, the author removes it by passing a current of dry air over the phenic acid nearly boiling.

The crystallization is facilitated by cooling, or by the introduction into it of a small quantity of the crystallized acid.

The author insists on the necessity of exposing the alkaline solution of the acid for a long time to favor the resinification and deposition of the brown matters; phenic acid is always impure when it is colored.

It should be quite pure when employed to make picric acid, because the impurities waste the nitric acid.

Phenic acid often contains a fetid substance, which appears to be a sulphuretted compound of phenyl or cresyle. It is removed by rectification from oxide of lead.—*From Zeitsch. für Chem., in Journ. de Pharm., Nov., 1865.*

W. P.

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## MANUFACTURE OF GLUCOSE.

By M. MAUBRE.

In this process the saccharification is made at the pressure of six atmospheres, produced by steam issuing from a boiler at 320° F. The boiler is of iron plate, lined with lead; it contains a leaden tube furnished with holes, and is provided with waste-pipes, valves, etc.

Twenty-eight kilogrammes ( $61\frac{1}{2}$  lbs.) of sulphuric acid, at  $66^{\circ}$  B. are diluted with 5600 kilogrammes (12337 lbs.) of water, and heated to  $212^{\circ}$  F. On the other hand, a similar quantity of liquid, at  $86^{\circ}$  F., is mixed with 2240 kilogrammes (4935 lbs.) of starch and heated to  $100^{\circ}$  F., agitated constantly, and introduced little by little into the open boiler, heated by steam till it is at  $212^{\circ}$  F., when the boiler is closed and heated to  $320^{\circ}$  F., and maintained at this temperature during some time. In from two to four hours the presence of starch is not detected by tests, when the solution is drawn off into a wooden vessel and incorporated with 168 kilogrammes (372 lbs.) of carbonate of lime suspended in 500 kilogrammes ( $1101\frac{1}{2}$  lbs.) of water, allowed to deposit till clear, drawn off, and evaporated to  $20^{\circ}$  B., clarified with blood and charcoal, etc., in the ordinary manner. —*Journ. de Pharm.*, from *Mechan. Mag.* W. P.

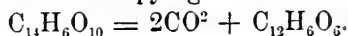
#### ON THE PREPARATION OF PYRO-GALLIC ACID AND SOME OF ITS PROPERTIES.

By MM. DE LUYNES AND ESPANDIEU.

Pyrogallie acid, first studied by Berzelius and Braconnot, was the object of remarkable researches by Pelouze in 1834, who, in describing its chief properties, made known the laws which govern its formation. Thanks to Chevereul, Regnault, and Liebig, pyrogallie acid has received numerous and useful applications. Its employment in the analysis of air, in photography, and in dying the hair, give it an important place among chemical products.

The properties and constitution of pyrogallie acid are worthy of the interest of the theorist. We have undertaken these researches to discover its true chemical nature. Although our work is not completed, we believe that these first results are worthy of presentation to the Academy.

The first point which has attracted our attention is the preparation of pyrogallie acid. According to M. Pelouze, gallic acid, heated in a bath to  $410^{\circ}$  F. in a retort, is completely separated into carbonic acid and pyrogallie acid.



Nothing remains in the retort, or only a residue hardly ponderable. According to this equation, 100 parts of dry gallic acid ought to give 74.1 of pyrogallie acid. Now the processes in actual use do not give a better product than 25 per cent. of the gallic acid. They are therefore very far from satisfying theory.

M. Dumas, in his lectures, has often insisted on the necessity of weighing bodies which are being operated upon, and afterwards of weighing their products of decomposition, so as to discover the discrepancies which exist between practice and theory.

Now the separation of gallic acid into pyrogallie and carbonic acids is not doubtful, consequently its preparation must be defective.

Yet this preparation has attracted the attention of eminent chemists. In 1843, M. Stenhouse indicated the process generally adopted of subliming the acid in cones of pasteboard. In 1847, M. Liebig obtained a result of 31 to 32 per cent. by mixing gallic acid with double its weight of pounded glass in a glass retort, heated by an oil bath and by effecting the sublimation in a current of carbonic acid gas.

If practice conducts to results so far from those which theory indicates, it follows that substances like pyrogallie acid, orceine, and all analogous compounds, though volatile without decomposition at certain temperatures, decompose at these same temperatures when they are exposed during a long time. That which renders the distillation of these substances impossible under the ordinary pressure, is therefore an affair of time and mass; and a stronger reason for the greater destruction of the material is when the distillation is preceded by a chemical decomposition like that which occurs during the preparation of pyrogallie acid.

Guided by these considerations, we have sought to separate gallic acid completely into pyrogallie and carbonic acids; by submitting it to the action of bases and water in close vessels, as one of us has done for the preparation of orceine; the reaction worked well, but the manipulations necessary to separate the base are too complicated. We have determined that, at the temperature of 392° F., the pyrogallie acid remains combined with the lime,

and that the carbonic acid is nearly altogether driven off. We then had recourse to pure water, and the results obtained have surpassed our hopes.

We introduce into a bronze boiler gallic acid, with two or three times its weight of water. Elevate the temperature from  $392^{\circ}$  F. to  $410^{\circ}$  F., maintain it during half an hour, and allow it to cool. The operation extends through one and a half to two hours. On opening the boiler, which contains a slightly-colored solution of pyrogalllic acid, it is heated with a little pure animal charcoal, filtered, and evaporated over a naked fire, to remove the water. By cooling, the pyrogalllic acid crystallizes under the form of a hard mass, of a light amber or sometimes rose-color. To have it quite white, it suffices to distill it in a vacuum. The product is equal to the theoretic yield, sometimes a little greater, owing to the retention of a little water by the pyrogalllic acid.

The boiler which has served our purpose is formed of a Papin's digester, and we employed a disc of pasteboard as the packing for the cover joint. We were astonished, in our first essays, not to find the carbonic acid, which passed through the joints, whilst the vapor of water is retained. We have determined the disengagement of carbonic acid by enclosing within the boiler tubes of glass full of lime and baryta waters, which were transformed into carbonates.

The distillation of pyrogalllic acid in a vacuum of two to three centimetres is made with great rapidity, and nearly instantaneously. M. Dumas has often called the attention of chemists to the advantage and even the necessity of distilling organic substances at low temperatures, by operating in the vacuum. The new pneumatic apparatus of M. Deleuil could be usefully applied in these circumstances.

M. Bayard, at the request of M. Regnault, has first tried this pyrogalllic acid, and M. Bertall has kindly compared the crude acid prepared by our process with the sublimed acid, which they generally use. The trials made in their work-rooms by means of the crude acid prove that it is quite equal to the sublimed acid.

We have studied the action of pyrogalllic acid on bases. We



have obtained with ammonia a crystalline combination analogous to that which it formed with orceine. Pyrogallie acid forms with quinine a compound remarkable for its indifference to crystallization. Finally, the chloride of acetylene reacts on it by disengaging hydrochloric acid and in forming a crystallized product, which contains acetic and pyrogallie acid, the composition of which we expect to determine. We would have postponed the publication of these results if we had not believed it our duty to make known the new method of preparing pyrogallie acid, which is the principal object of this note.

These experiments have been made in the laboratory of the Faculty of Sciences of Paris.—*Journ. de Pharm.*, Nov., 1865.

W. P.

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PEPPER.

BY JOHN R. JACKSON.

Of all the senses with which we are endowed, that of taste is perhaps the most fastidious; unlike the senses of sight and hearing, it is not so varied or widely affected by the force of education. To hear and appreciate the eloquence of an oration, needs some cultivated refinement, and is, in consequence, the belonging of a class. As applied to the sight, the same may be said of a fine picture or other work of art; but with the senses of taste and smell, the case is different, though refinement and education undoubtedly lend a helping hand to the full appreciation of both. With the former, however, the likes and dislikes are more affected by nations than classes, and this, in a great measure, is doubtless to be attributed to the diversity of the products of each clime, the love for which is inherent in its people. For example, where can an Englishman find fare so well suited to his palate as in his own land? And a similar question may be asked of other nations; and yet there are countless productions of foreign lands, the uses of which have not become general with us solely through prejudice; and this applies not alone to articles of food, but also to materials useful in the arts and manufactures. It needs a persevering energy to bring new products into the English markets, and it needs even more to persuade the British public to give a fair trial to such products,

many of which might become a source of commercial profit, besides being advantageous to the consumer. As an example of this, the most familiar illustration is tea, which, but 200 years since, was scarcely known in this country, the Dutch East India Company having sent, in 1664, two pounds as a present to the king. When, however, an importation of a few pounds took place three years later, there was probably some prejudice against its general adoption. We venture to doubt that, as a new commodity in our own day, the pure aroma of tea would find little favor at first with the general public, though now, thanks to the energy and enterprise of modern commerce, the tea trade employs upwards of 60,000 tons of British shipping, besides bringing an enormous revenue to the Government. What we have said of tea, might also be said of many other products, including pepper, with which we now propose to deal; even Pliny of old expresses some surprise that an article, as he says, possessing neither flavor nor appearance to recommend it, should become of such general use as it had in his day.

In a commercial sense, the word pepper has scarcely any restrictions or limit; nearly everything hot or pungent comes under the designation. Thus, we have cayenne pepper, which, in reality, is produced from various species of capsicum; melagüeta pepper, the seeds of *Amomum Melagüeta*, and Ethiopian pepper, the fruits or *Habzelia Æthiopica*. These, in the customs returns, are all classed under the head "pepper," so that it is difficult to tell the exact amount of true pepper imported; but, in a botanical sense, pepper is known as the product of one plant only, and that the *Piper nigrum*. To show the importance of this article in British commerce, as well as the large revenues it brings to the Treasury, we cannot do better than briefly trace the history and development of the pepper trade. It seems pretty clear that its uses were well known to the ancient Greeks; as a medicine, it was also early known, being employed as such by Hippocrates. We quote the following interesting paragraph from Simmonds's "Commercial Products of the Vegetable Kingdom:"—Pliny, the naturalist, states that the price of pepper in the market of Rome in his time was, in English money, 9s. 4d. per pound, and thus we have the price of pepper at least 1774

years ago. The pepper alluded to must have been the produce of Malabar, the nearest part of India to Europe that produced the article, and its prime cost could not have exceeded the present one, or about 2*d.* per pound. It would most probably have come to Europe by crossing the Indian and Arabian Ocean with the easterly monsoon, sailing up the Red Sea, crossing the Desert, dropping down the Nile, and making its way along the Mediterranean by two-thirds of its whole length. This voyage, which, in our time, can be performed in a month, most probably then took eighteen. Transit and customs duties must have been paid over and over again, and there must have been plenty of extortion. All this will explain how pepper could not be sold in the Roman market under fifty-six times its prime cost. Immediately previous to the discovery of the route to India by the Cape of Good Hope, we find that the price of pepper in the markets of Europe had fallen to 6*s.* a pound, or 3*s.* 4*d.* less than in the time of Pliny. What probably contributed to this fall was the superior skill in navigation of the now converted Arabs, and the extension to the islands of the Eastern Archipelago, which abounded in pepper. After the great discovery of Vasco de Gama, the price of pepper fell to about 1*s.* 3*d.* a pound, a fall of 8*s.* 1*d.* from the time of Pliny, and of 4*s.* 9*d.* from that of the Mahomedan Arabs, Turks, and Venetians." The pepper plant (*Piper nigrum*, L.) is a native of the coast of Malabar and the southern parts of India, but is now largely cultivated in the East and West Indies, Sumatra, Borneo, Siam, and other places within the tropics. It is a perennial with a climbing shrubby stem; the berries or fruit are borne upon a spadix that is arranged in dense clusters round a central stalk; each of these spadices contains from twenty to fifty berries. The propagation of the pepper plant is chiefly by cuttings, though they will grow well from seed, but of course the plants take longer time before they come into bearing, which is a great consideration when pecuniary profit is the aim. The richer the soil, the better the plants thrive. In forming a plantation, the grower will take his cuttings and plant them perhaps from seven to twelve feet apart. The climbing habit of the plants renders it necessary to provide some support for them to trail upon.

Each individual plant is supplied with some kind of prop, but in many plantations, these supports are cuttings of some spiny or thorny tree, which, striking in the ground and throwing out its leaves above, furnishes at once both a support and shelter for the young pepper plant. If grown on a rich soil, the plants will bear fruit in a small proportion, even in the first year, increasing their produce annually till the end of the fifth year, when they yield about eight or ten pounds per plant, and this is about the average produce up to fifteen or twenty years, after which the plants begin to decline, seldom or never surviving beyond the thirtieth year. A pepper plantation has a peculiar yet picturesque appearance, the regular intervals between the plants and the plants themselves carefully trained against their props, gives to it an air of remarkable uniformity seldom seen in the cultivation of other crops. The plants, which, on account of their climbing habits, are technically called pepper "vines," are allowed to run up their supports to a height of three or four feet; the tops are then bent down to the ground, and the young shoots which spring from these are tended with great care and neatly trained upwards. The plantations in Sumatra are said to be models of neatness and cleanliness, all weeds and refuse being carefully removed. The fruits when first formed are green, changing to red, and finally to black. When they make their first change from green to red, they are considered fit for gathering, for, if left longer on the plants, they are apt to drop off, besides losing a portion of their pungency. After gathering, the berries are spread on mats and exposed to the sun to dry; they are then rubbed between the hands to remove the short stalks. This constitutes black pepper; but both black and white pepper are the produce of the same plant; with this difference, that the white is the largest picked berries, gathered at the fullest state of maturity, and denuded of its black outer husk by soaking in water. White pepper, as we all know, fetches a higher price in the market than black, not on account of its greater pungency; for, as we have seen, it has less, losing, as it does, much of that most important principle in the husk of which it is deprived, and also in the process of steeping and bleaching. A good story is told in Mr. Cameron's new book upon

"Our Malayan Possessions," illustrating the ignorance of the directors of companies of the products or basis of the company's operations. The story runs somewhat in the following manner:—The directors of a Bencoolen pepper plantation, alert, as they should be, to the interests of the shareholders, finding that white pepper, which commanded a higher price than black, had as ready a sale, and was, therefore, more profitable, immediately sent orders to the manager of their plantation for greater care to be bestowed upon the plants yielding white pepper than those yielding black. This must have been highly amusing to the growers themselves.

The black pepper vine is indigenous to the forests of Malabar and Travancore. Its cultivation is very simple, and is effected by cuttings or suckers put down before the commencement of the rains in June. The soil should be rich, but if too much moisture be allowed to accumulate near the roots, the young plants are apt to rot. In three years, the vine begins to bear. They are planted chiefly in hilly districts, but thrive well enough in the low country, in the moist climate of Malabar. They are usually planted at the base of trees which have rough or prickly bark, such as the jack, the erythrina, cashew-nut, mango-tree, and others of similar description. They will climb about twenty or thirty feet, but are purposely kept lower than that. During their growth, it is requisite to remove all suckers, and the vine should be pruned, thinned, and kept clear of weeds.

The berries must be plucked before they are quite ripe, and, if too early, they will spoil. The pepper vine is very common in the hilly districts of Travancore, especially in the Cottayan, Meenachel, and Chengaracherry districts, where, at an average calculation, about 5,000 candies (of 500 lb. each) are produced annually. It is one of the Sircar monopolies. It may not be irrelevant to mention here the *P. triocum*, Roxb., which both Dr. Wright and Megnel consider to be the original type of the *P. nigrum*, and from which it is scarcely distinct as a species. The question will be set at rest by future botanists. The species in question was first discovered by Dr. Roxburgh, growing wild in the hills north of Samulcottah, where it is called, in Teloogoo, the "Merial-tiga."

It was growing plentifully about every valley among the hills, delighting in a moist, rich soil, and well shaded by trees; the flowers appearing in September and October, and the berries ripening in March. Dr. R. commenced a large plantation, and, in 1789, it contained about 40,000 or 50,000 pepper vines, occupying about fifty acres of land. The produce was great, about 1000 vines yielding from 500 to 1000 lb. of berries. He discovered that the pepper of the female vines did not ripen properly, but dropped while green, and, when dried, had not the pungency of the common pepper; whereas, the pepper of those plants which had the hermaphrodite and female flowers mixed in the same amount was exceedingly pungent, and was reckoned by the merchants equal to the best Malabar pepper.

Several varieties, both of black and white pepper, are known in commerce. Of the black, the most valuable comes from Malabar, and is known as Malabar pepper. It is very clean, and free from dust and stalks. Penang and Sumatra pepper are also varieties of black, known in the markets; the former has, perhaps, a larger berry than the Malabar; but, unlike that, it is very dusty. Sumatra pepper is the commonest, and, consequently, the cheapest; it is very dusty, and has a large proportion of stalks mixed with it. Of the white kinds, Tellicherry pepper is the most valuable, fetching a much higher price than any other of the white varieties: the berries are also larger, and of a purer white. The common white pepper of our shops is imported chiefly from Penang, and varies in price, according to size and whiteness; much of the white pepper, however, as seen in trade, is nothing more than the black Penang sort, bleached in England. Besides these varieties, there is a kind of bleached black pepper, the bleaching of which is effected by chlorine.

Great as is the consumption of pepper, the high rate of duty imposed upon it tends to cripple the full development of a trade which might become of vast proportions. An ample illustration of this fact is found in the increased consumption of pepper in the years following a reduction of the duty. In the early part of the present century, the impost levied was as much as 1s. to

2s., and even 2s. 6d. per pound, while the cost price in Singapore ranged no higher than from 6d. to 8d. In proportion as the duty was lowered, so the price of pepper fell, and the consumption became likewise proportionately greater. The prime cost of Singapore pepper, at the present time, does not exceed 1d. or 1½d. per pound, and that from Malabar, Sumatra, and Penang, about 4d., while white pepper fetches from 9d. to 1s., and perhaps 1s. 6d. In Singapore, where immense pepper plantations exist, the cultivation is chiefly carried on by Chinese settlers, who, owing to the heavy impost in this country, to which the bulk of their produce is shipped, find it a very poor and scarcely profitable speculation, requiring, as the plants do, so much care and attention. From the foregoing facts, it is easy to see that, were the present duty of 6d. per pound reduced, we might expect a corresponding increase in our importations, which would probably add to, rather than diminish, the public revenue, for we might safely depend upon the use of pepper becoming more extended, so generally appreciated as it is.

The plant which furnishes melaguetta pepper, or grains of Paradise, now pretty well known to botanists, seems remarkable for its variable size, especially as shown in its fruit. According to Dr. W. F. Daniell, the variety grown at Accra is the largest. The smaller, which grows on higher ground, is called in Fernando Po, *Toholo M' Pomah*, or M' Pomah pepper.

Specimens of the flowers of each variety are desirable to ascertain if they belong to one and the same species.

Of bastard or false melaguetta peppers there are several beautiful species, quite distinct and different from each other, and very imperfectly known to botanists. The fruit of some of them is used by the blacks for the sake of its acrid pulp, which is agreeable to the taste. They are tall, flag-like plants, with handsome flowers and fruits produced near the roots. Melaguetta pepper, true or false, belongs to the botanical genus *Anomum*.—*Lond. Pharm. Journ.*, Nov. 1, 1865, from *Technologist*.

## ON COTTON-SEED OIL, AND ITS DETECTION WHEN MIXED WITH OTHER OILS.

BY R. REYNOLDS, F. C. S.

In the year 1785, the Society for the Encouragement of Arts and Commerce offered a prize for the successful manufacture of oil from cotton-seed, but it has not yet been awarded. The difficulties in purifying the expressed oil seem to have been insuperable for a long while, though for several years past the oil has been coming into use in the United States. In our own country, trifling quantities have been produced during the last dozen years or so, but at the present moment a very considerable quantity is being expressed in England.

There is too much reason to believe that nearly the whole of this is used in the sophistication of oils of older repute. The probability that the supply will now continue and increase is specially indicated by a consideration of the source of the oil. The weight of the seed yielded by each cotton plant is about three times as great as the cotton obtained from it, and up to the present time nearly the whole of this seed has been wasted, or returned to the soil as a fertilizer. The present price of the refined oil is less than 3s. per gallon, and, considering the large proportion of seed that has yet to be utilized, it is probable that it will long continue to be the cheapest fixed oil in the market. Hence the desirability of our giving some attention to a substance which is pretty sure to present itself to us in our daily avocations in some shape or other.

As might have been expected, cotton-seed oil has been noticed in the literature of our American brethren. Thus, in 1856, Mr. Wayne brought it under the notice of the American Pharmaceutical Association, and in 1861 it formed the subject of an inaugural essay by Mr. Weatherley, (*Pharm. Jour. N. S.* vol. iii. p. 30.)

Mr. Weatherley's essay well deserves attention. The author repudiates much of the discredit thrown upon the oil on account of its asserted drying qualities, and says that it answers well for both burning and lubricating.



Mr. Weatherley made some experiments in substituting "winter-bleached" cotton-seed oil for olive or almond oils, in various pharmaceutical preparations. He states that cold cream, spermaceti ointment, citrine ointment, and some liniments were so prepared, and fully equalled the results of the officinal formulæ.

In England, Dr. Adriani has studied the properties of this oil (Chem. News, Jan. 7, 1865.) He states that the crushed seed is heated to about 180° Fahr., and then pressed, when 15 to 18 per cent. of a dark brown-red oil is obtained. The specific gravity is .930 or .931, and in this respect, as well as in taste, odor, and drying qualities, it has much resemblance to linseed oil, from which, however, it differs in its darker color. Dr. Adriani has shown that the dark brown-red color possessed by the oil does not pre-exist in the seed, but that it is the result of the oxidation of a yellowish-green principle that is found in the seed, and which may be extracted from it with unchanged color, if precautions to exclude the air be adopted. Much attention has been given in some quarters to the utilization of this principle as a dyeing agent, but without successful results.

The operation of refining the oil consists chiefly in heating it with a weak solution of caustic potash or soda (the former by preference.) A preliminary treatment of the oil by boiling water, to remove mucilaginous matters, much facilitates the operation. If the crude oil be well agitated with solution of potash without the application of heat, the mixture, after repose, will yield a yellow layer of "refined oil" floating upon an aqueous solution that is nearly black, from the coloring matter extracted from the oil. A singular purple-colored film may also be produced upon the surface. The loss in refining is stated at about 15 per cent.

I have only to add a few remarks upon the detection of this oil when mixed with olive oil. A well-known chemist, whom I regard as the highest authority upon the subject of the adulteration of oils, tells me that he does not know of a test for this purpose.

The experiments which I have made induce me to regard the nitrate of mercury test as affording sufficiently clear reactions to enable us to find this oil when mixed with olive oil.

I have used Poutet's test as follows:—6 parts of mercury are dissolved in  $7\frac{1}{2}$  parts, by weight, of nitric acid 1.36 without the application of heat, and form the test solution. The tubes for making these experiments are merely strong test-tubes of 7 inches in length, and holding about a fluid ounce. They are roughly graduated by pouring in 30 minims of water and scratching a line upon the glass; another line is made at the point reached when a total of 6 drachms of water have been poured in. The lower line is marked "test," the upper one "oil." Pour in first the test to its mark, and fill up with the suspected oil to the other line; shake well and set aside, shaking again about an hour afterwards. In from three to twelve hours, according to the temperature, etc., a genuine olive oil will have solidified entirely, the product after the latter interval being quite hard when touched by a glass rod. Cotton-seed oil, when similarly treated, will not solidify, but remains fluid. A mixture of 24 parts of cotton-seed oil, with 75 parts of olive oil gives an intermediate condition. The contents of the tube become solid, but if a little be taken out with a glass rod, it is found to be soft, pasty, and without any friable character. On the other hand, when pure olive oil is so treated, the product is hard, friable, and not pasty. Comparative trials should always be made, and caution exercised in accepting the apparent conclusions. Where only  $12\frac{1}{2}$  per cent. of cotton-seed oil is present, the reactions are not so distinct as with 25 per cent., but I consider them usually sufficient to decide the case.

I believe that when the adulteration of olive oil is so prevalent as at the present time, it is the interest of the members of the drug trade to use this test themselves, and also, in many cases, to inform large consumers how easily it is applied.—*Proceedings of British Pharm. Conj. and Pharm. Jour., London*, Oct. 1, 1865.

## ON LIQUIDAMBAR STYRACIFLUA AND ITS BALSAMIC RESIN.

BY WILLIAM PROCTER, JR.

According to Michaux (*Sylva Americana*), Liquidambar styraciflua is the most extensively diffused of all the forest trees of North America, being found as far north as  $43^{\circ} 30'$  on the Atlantic coast, and as far south as old Mexico, spreading westward as far as the Illinois river, and southward thence to the Gulf of Mexico. Sweet gum is its most common name, but in New Jersey it is known as *linn*, and in Louisiana it is called *copalm*. It is probably largely found in Texas, and some of the largest specimens were seen by Michaux in Georgia, between 5 and 6 feet in diameter, and W. P. Creecy speaks of specimens in the State of Mississippi 100 feet high. In New Jersey I have seen the tree 60 feet high and  $2\frac{1}{2}$  feet in diameter. From an early period it has been known that this tree affords, both spontaneously and when wounded to the sap, a soft resinous exudation, which is known by the name of *sweet gum*, and used as a masticatory. There are two forms of this exudation which are described by Guibourt in his *Histoire des Drogues*, as coming from Mexico and Louisiana. One soft and resinous, becoming brittle by age and analogous to tolu in consistence, the result of spontaneous exudation and hardening on the bark. The other a transparent oleo-resinous liquid, like copaiba in consistence, and obtained, by incision, immediately into the vessels in which it is kept to avoid the action of the air upon it. According to Guibourt these products contain considerable quantities of benzoic acid, and have the odor of storax. In vol. vi., page, 190 of the *American Journal of Pharmacy*, William Hodgson, Jr., states, that 1000 parts of the balsam procured from Louisiana, yielded, by boiling with soda and precipitation by an acid, 42 parts of benzoic acid, and he thinks as much as 6 per cent might be obtained with careful manipulation.

Prof. C. W. Wright, of Kentucky (see *Am. Jour. Pharm.* vol. iv., new series, 1856, p. 413), says, "When an incision is made through the bark of this tree, a resinous juice exudes which possesses an agreeable balsamic odor; at first it has the consistence

of turpentine, and has a stronger smell than after it has become resinified. Contrary to the statements made in the U. S. Dispensatory this tree furnishes a considerable quantity of resin in the Middle States bordering upon the Ohio. It is annually collected and sold under the name of gum wax. By proper incisions the tree will yield annually about three pounds of the resin." Prof. Wright says its composition is *benzoic acid*, volatile oil, styracin, &c., which accords with Bonastre.

In 1856 the writer sent a specimen of this balsam, obtained at Cincinnati, to Mr. Hanbury of London, who in a letter on that subject states that the balsamic acid present in it is *cinnamic* and not benzoic acid, as described by Guibourt, Hodgson and others. At the recommendation of the writer this balsam was made the subject of an inaugural essay presented to the Philadelphia College of Pharmacy, 1860, by Wm. Prior Creecy, of Mississippi, (see vol. viii. 3d series of the American Journal of Pharmacy,) who, starting from the suggestion of Mr. Hanbury, sought to determine the nature of the volatile acid matter in the balsam. The results of numerous experiments by Mr. Creecy, seems to prove that the chief volume of the acid present is cinnamic, but that the balsam also contains a smaller portion of benzoic acid. He also found a volatile oily substance, having the fragrance of the balsam, in small quantity, besides a large quantity of resin.

These are the principal observations I have been able to collect in reference to this subject, and now will make a few remarks pointing more directly to the question called for by the query of 1863.

In the fewest words this query asks, whether the Liquidambar of the United States will yield a product similar to storax, if treated like the Liquidambar orientale, the source of that drug. Now, according to Mr. Hanbury's account (Pharm. Journ. 1857,) liquid storax is prepared by removing the outer bark of the latter tree, and scraping the inner live bark which causes it to secrete the storax balsam, which is then scraped off together with parts of the bark and purified by boiling it in large copper boilers, during which probably the moisture of the inspissated juice is evaporated and the extraneous bark removed; when it is strained into casks. Another account says, that the inner bark itself is boiled and sub-

sequently expressed to remove the balsam, and that the residual bark is the storax bark of commerce. Viewed from the standpoint afforded by the American tree, I should be more inclined to believe the former account was the correct one, and that in the heating process, which is probably carried out without much care, the whole mass acquires a uniform adhesive texture, and a semi-empyreumatic odor, points which chiefly distinguish the oriental balsam from its American analogue.

Earnest endeavors were made after the last meeting to obtain some practical experiments on the tree as it grows in Tennessee, Arkansas, and other places from friends residing in those localities; but all my correspondents failed me except my friend Hennell Stevens, Medical Storekeeper U. S. Army, at Memphis, who sent me a small specimen of the balsam obtained by incising the bark transversely, and another vial of balsam the result of natural exudation. The main point was not reached; owing to the disturbed condition of all the country where the temperature is favorable to the process, and for want of the time necessary to make the experiment, it has not been possible to get the results required. In the month of May last, I determined to try some experiments on the New Jersey tree. The first was about 30 years old and a foot in diameter, growing in a high and dry soil unfavorable to its development. A portion of the outer bark was removed, and the exposed live bark wounded by bruising, so that it cracked in several places. In July the inner bark was found to be entirely dead, and beneath the dead bark where it joined the upper edge, an exudation of soft resin was found, like that from the southwest in odor and taste. Another experiment was tried upon a tree growing near water, two and a half feet in diameter, with no better success. The same balsamic exudation after a time, but too limited in its quantity and too slow in its secretion to meet the case required. It should be observed that the bark itself, when recently cut, possesses no aroma like the balsam. The latter does not, like the turpentine, circulate in the juices of the plant, but appears to be due to the action of air on those juices where a rupture of the tissues takes place, being apparently an effort of nature to heal the abrasion. When the inner bark, free from contact with the oleo-resin, is triturated with a little water,

and permanganate of potassa is added, no indication of cinnamic acid occurs. Now this fact may not be true of the tree in all localities. At the south-west the bark may be resinous in its nature, and imbued with a balsamic odor, and thus approach more nearly in character the oriental species.

I am informed that in the lower counties of Delaware and Maryland the farmers are in the habit of collecting the balsam under the name of "gum wax" for use as a masticatory, and as an application for corns. By means of a hatchet a narrow transverse section of bark is removed, the incision being made at an angle of  $45^\circ$ , so as to form a sort of pocket in which the resin exuding from the upper side of the wound collects. It is often as colorless as turpentine and always exceedingly adhesive, and mostly sought from trees of two or two and a half feet thick.

Michaux casually observes that in repeated experiments in Carolina, trees a foot in diameter afforded but half an ounce of exudation in a fortnight.

It may be proper here to notice a letter received soon after the meeting of 1864, from Mr. Daniel Roemer, of Cincinnati, who had resided in Mexico: "Sir you have continued to you the query, 'will Liquidambar s. yield a product identical or nearly so with storax, &c.' A great quantity of *liquid storax* is produced in Mejico; from what plant I am unable to say; it is very black upon the top, and the dark color penetrates generally somewhat deeper than in the commercial storax. It is so plentiful that the Mejican Pharmacopœia directs Emplast. Hydrargyri to be made with it; and it must be of excellent quality, as the French perfumers (Mejicans are too civilized and too aristocratic to use any other than French perfumery,) use this in place of the imported storax whenever they need it, which is undoubtedly a great testimony to its excellence." M. Roemer was unacquainted with the botanical source of this native storax, but referred to an eminent Pharmaceutist of the city of Mexico, Don Leopoldo Rio de la Loza, who he believed could give information about it. Whether this Mexican storax is really a product of the Liquidambar or of a tree of the genus *Myrospermum*, I am wholly at loss to determine, but deem it a subject of interest.

It may be apposite to refer to the bark recently noticed in the

Journal of Pharmacy by Prof. Mayer, which came into New York commerce, under the name of *sacred bark*, as in his opinion probably a product of *Liquidambar Altingiana* of *Blume*, and to which one of the varieties of storax is attributed by some writers, contrary to Mr. Hanbury, who inclines to refer it all to the species *orientale*. The fact that Prof. Mayer detected cinnamic acid in this bark, and a soft resin with a storax-like odor, renders it interesting to know whether it really belongs to some species of *Liquidambar*; for, unless it can be shown that this acid may be secreted in the natural tissues of one species and not in others, it is an argument against that origin of the bark in question.

Having in my possession a few ounces of the "sweet gum" which I had kept in my cabinet for eight years, it was determined to make a few experiments with it in reference to the volatile acid present.

Half an ounce of the balsam in fragments, was put into a small iron capsule, covered with filtering paper held closely by paste, and a small Mohr's subliming cap of pasteboard applied over it, gas heat was gradually applied as long as crystals collected in the cap. The quantity was much smaller than an equal weight of benzoin would have yielded, but in appearance they were like benzoic acid. Examined with a lens they presented the form of flattened needles, some of which have oblique terminations. Placed on mercury, in which a thermometer dipped, and heat applied, they partially fused when the mercury arose to 260° F., when at 280° the crystals dropped upon the mercury instantly melted. They are soluble in cold strong nitric acid, and on standing a short time produced an abundant crystallization of nitro-cinnamic acid. When heat is applied to the solution, nitric oxide is evolved with ebullition, a few crystals mixed with a little permanganate of potassa instantly developed the oil of bitter almonds.

Half an ounce more of the sweet gum, in coarse powder, was boiled with milk of lime, water being added several times, until apparently exhausted, the amber colored liquid filtered and allowed to stand until cool. No precipitation occurred; on again heating and adding muriatic acid in slight excess a crystalline precipitate fell, which when collected and dried weighed about eight grains. These crystals afforded oil of bitter almonds with

permanganate, fused readily at  $260^{\circ}$  F., and yielded nitro-cinnamic acid with strong nitric acid. It is evident from these results that but little if any real benzoic acid exists, and that Mr. Creecy's experiment with the sublimed acid, testing by chlorinated lime, must have been imperfect, as a sublimate obtained in these experiments instantly developed oil of bitter almonds, in contact with permanganate of potassa. It is also evident that the earlier observers, Bonastre and Hodgson mistook cinnamic for benzoic acid.

The leaves and capsules of the sweet gum both give a somewhat aromatic odor when bruised, and are both decidedly acid to the taste and to litmus. When the green capsules are bruised and thrown into alcohol they become brown after a few hours, and afford a brown transparent tincture decidedly acid to litmus paper. The tincture of the fresh leaves made with alcohol 817 is green, decidedly acid and very astringent. When a per salt of iron is added a deep bluish black color is found, the greater part of which is discharged by heating to  $212^{\circ}$  F. It is highly probable that gallic acid exists to a considerable extent in these leaves, but I have not had time to verify the supposition. According to Prof. C. W. Wright, of Kentucky, the bark contains so much tannic and gallic acid as to be valuable as a remedy in diarrhœa.

In concluding this paper, the writer regrets that he has not been able to decide the question he had proposed to himself, viz: the preparation of liquid storax corresponding with that of the Levant, yet without asking a continuance of the subject he still hopes to accomplish it, now that access is to be obtained freely to the south-west.

*Philadelphia, Sept. 1, 1865.*

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#### ON THE CULTIVATION OF VANILLA IN MEXICO.\*

The vanilla is a climbing plant, and, like the ivy, rises from the ground by the help of the trees, which it finds, and which it almost covers with its foliage. Its stem, which is of the

\* From Müller's *Reisen in den Vereinigten Staaten, Canada und Mexico*, in *Vierteljahresschrift f. Pharmacie*.



thickness of the little finger, is greenish, fleshy and almost cylindrical, and has, like the vine, occasional nodes and runners. Each node is furnished with a thick opposite leaf, about eight inches long and three wide. Its roots, which penetrate the bark of the tree, find there sufficient nourishment to keep the plant fresh and vigorous, even when the lower part of the stem may have become accidentally injured, or even separated from the root.

When the stem has reached a certain height, it begins to branch, spreads out on all sides, and becomes covered with large flowers, which are greenish externally, but white within. The flower changes in ripening into a pod seven to eight inches long, which is filled with an oily mass of small, black, shining seed. The plant commonly grows in the forest, in uncultivated, moist places, which are often overflowed, and become covered with rank vegetation. To propagate it, it is sufficient to plant cuttings, taken off near the lower part of the stem, which soon take root and send up shoots. If these shoots are allowed to spread upon the earth, or over the tangled underbrush, the fruit becomes exposed to the danger of spoiling, to prevent which the young plants are bound to the trees a short distance above the ground, on the bark of which they immediately take root, and grow downwards towards the earth. Air roots are sent out, which, seeking the ground, soon obtain a more secure footing than those cuttings which are committed entirely to the soil, which latter frequently decay or wither.

The vanilla ripens generally about the end of March, and the harvest lasts about three months. In its fresh condition it has no smell which would particularly remind one of that excellent aroma it acquires during the preparation which it undergoes. This valuable plant grows wild in many parts of the Mexican Territory, as also in the ever green, warm and damp forests of Cuba, and there is nothing else necessary to be done by the natives than to gather and dry its aromatic fruit, a process which was formerly kept as a secret, but which was soon acquired by the Spaniards.

The vanilla plant flourishes on the East Coast, and also in the Western Departments of the Cordilleras, in the States of

Vera Cruz and Oaxaca, between the nineteenth and twentieth degree of north latitude. The natives, familiar with the difficulty of penetrating far into the wilderness of forest, and the almost impassable thickets, in search of the fruit, which, moreover, does not ripen always at a certain time, have adopted a mode of planting by which, in the comparatively small space of a few square miles, a considerable number of plants have been introduced, whose culture requires neither effort nor care. All that is necessary is to clear the ground around the trees in the forest which it is intended to plant, and to set two cuttings at the foot of a trunk, or to fasten a few small pieces of the vine upon a young tree, in the bark of which they immediately take root, send down air-roots to the ground, and soon obtain a secure footing. The Indians prefer to select the trees yielding balsamic resin, oil or gum, which, besides serving to support the vine, may also exert a more or less favorable influence upon its agreeable smell. The cuttings are generally 32 to 36 inches in length. The vanilla begins to bear fruit in the third year after planting; each shoot affords yearly about fifty pods, and continues to yield this number for thirty to forty years, particularly if its growth has not been obstructed by rank weeds or stifled by climbing plants. The wild vanilla, (*la vainilla\* cimaroná*), occurring in even the thickest part of the jungle, affords only very small and dry fruits, which are not prized; when the vines, however, of this plant are transferred to a cleared and prepared soil, its pods become similar to those of the best cultivated vanilla, (*Vainilla criolla*.)

The points most noted for the cultivation of, and trade in vanilla, are the Indian Villages of Misantla, Coliba, Yucuantla, in the state of Vera Cruz, Nantla, Santiago, San Andres de Tuxtla, Jaquila, Sacatepec, and several other places in the western division of the Cordilleras, in the State of Oaxaca, as also in the States of Tobasco, Chiapas and Yucatan. The Indians of Misantla gather the vanilla in the mountains and forests of Quilates, where the plant blooms in February and March. The harvest is of little value if, during this period, powerful

\* The name vanilla, properly vainilla, is the Spanish diminutive of *vaina*. (pod. legume.) thus signifying a small, thin pod or legume.

north winds occur, accompanied with heavy rain, beating off the blossoms, nor if the dampness of the season is too great or long continued. Excessive dryness also injures the growth and value of the vanilla.

On account of the glutinous, milky juice which the green pods contain, they are not attacked by worms or by insects. The season of gathering begins at the end of March, and lasts generally to the end of June. The Indians, who remain about eight consecutive days in the forests for this purpose, mostly sell the fresh and yellow pods to the settlers, who make a business of drying, bundling, pressing and otherwise preparing them for sale. In Misantla the usual way of drying the vanilla is to spread the yellow pods upon a linen cloth, and, when the weather permits, to expose them to the sun, and allow them to sweat for a few hours. As soon as they are sufficiently heated, they are wrapped in woolen cloths, *upon which they immediately assume a dark copper color*, when they are again exposed to the sun's rays from morning till evening, until entirely dried. Should long continued rain make it impossible to expose them to the sun until they assume this blackish-brown color, and become covered with silvery spots, it is necessary to have recourse to artificial warmth. For this purpose the natives weave a frame, or a kind of four-cornered sieve, of the Spanish cane or split bamboo, to spread the pods upon, which they hang up by cords and cover with a woolen cloth. This frame is then placed over a fire, which does not smoke, and a gentle vibrating motion given to it. This operation, which is called "*el beneficio del Poscoyal*," is by far more difficult, and requires long experience and great care that the waste of the product is not too considerable.

In Misantla the prepared pods are packed in bundles of 50 each, which are divided, as follows, into four different classes; since the nature of the soil, the dampness of the air and the sun's heat exert an essential influence upon the bulk and weight of the parts which are charged with oil and with the aroma: (1.) The best vanilla, *la vainilla fina*, with the subdivisions of the large best and small best, *la grande fina* and *la chica fina*, or *la mancuerna*; (2.) el Zacate; (3.) el Bezacate; (4.) la Basura.

(the refuse or offal.) These four kinds are tied up differently, in order to be readily distinguished in commerce. The large best is usually 22 centimetres long, and each bundle weighs, in Misantla,  $10\frac{1}{2}$  ounces; in Coliba 9 to 10 ounces. The small vanilla is 17 centimetres long, and is about half as valuable as the former. The Zacate is a very long, but a thin, moist pod, and must be examined and aired, particularly after a long sea voyage, before it goes into the European market. The offal, or refuse, serves as an under and upper layer in the chests in which the better classes are packed for exportation. Each bundle of this sort consists of 100 pods. There are also two other sorts of vanilla, but which are now scarcely ever seen in commerce, viz., the wild vanilla, (*la vainilla cimaronas*, or *de palo*), a very thin, dry pod; and the showy or splendid vanilla, (*la vainilla poposa*), with very fine, large fruit, but of a different smell from that of the best vanilla, on which account it has not met with a favorable reception in Europe nor in the East.

The neighborhood of Papantla produces comparatively little vanilla, which is besides generally not well dried, but is always very aromatic; the purchasers are, therefore, obliged to dry it carefully over again. The locality of Teutila, in the State of Oaxaca, has acquired a deserved reputation, on account of the celebrated vanilla growing in its surrounding forests. In this place the inhabitants prepare the pods with great care, perforating them with needles on all sides, in order to facilitate the exudation of the milky juice, and dry them strung upon threads.

The forests of Quilates yield in good years about 800,000 pods; in very wet years the yield falls to 200,000. The average annual production in Misantla and Coliba, is about 700,000 pods, in Papantla 100,000, in Teulita 110,000. The harvests of Santiago and San Andres de Tuxtla are very various. The above mentioned productions of the provinces of Oaxaca and Vera Cruz have remained almost the same for a century. In 1802 1,793,000 pods were exported from Vera Cruz; to-day the amount exported is no larger.

## PRESERVATIVE AGAINST CHOLERA.

Dr. H. Hager publishes in Vol. vi, No. 34, of his *Pharmaceutische Centralhalle*, the following:

Cholera is a horrible epidemic, which has paid us repeated visits during the last thirty years; which, like the wandering Jew, finds no mountain too high, no water too deep to cross, no summer too hot, and no winter too cold. Specific remedies for this disease are unknown, because its character is greatly modified by circumstances. The curing of the cholera patients belongs to the physicians; but let us pharmacutists preserve ourselves against the attacks of this disease as much as possible, in order to maintain our position as the indefatigable preparers of medicines.

The observance of the well known dietetic rules is the first most important condition. Besides, we recommend several preservatives, which we have proved ourselves, and which we and many of our friends have tried, without any one of them having been attacked by cholera.

The best among the preservatives is quinia, which protects against typhus and cholera alike. It is possible that its tonic properties, acting in the general human organism, subdues the disposition to that malady. Its different action in large and small doses must not be overlooked. As preservative, only the roborant action of small doses comes into consideration. A good chinoidine may be substituted for poorer people, and to exert its roborant properties, must be combined with mineral acids.

The following are some recipes for this purpose:

*Pilulæ Prophylacticæ Anti-Cholericæ.*

R.—Quinæ sulphatis, gr. 60  
 Acidi sulphurici diluti, gtt. 40  
 Pulveris aromatici, gr. 90  
 Radic. Althææ pulv., gr. 30  
 Extracti Trifolii, q. s.  
 ℞. ft. pilul. No. 120. Consperg.  
 Cass. cinnam.

S. Take two or three pills every morning, noon, and evening, always after meals.

R.—Quinæ sulphatis,  
 Pulveris aromatici, aa gr. 60  
 Acidi hydrochlorici, gtt. 15  
 Liquoris Ferri sesqui-chloridi, gtt. 20  
 Radicis Gentianæ pulv.  
 Extracti Trifolii, aa gr. 40  
 Olei Cassiæ Cinnam., gtt. 10  
 Rad. Althææ pulv., q. s.  
 ℞. ft. pilulæ No. 120.  
 S. As before.

R.—Chinoidini, Pulveris aromatici, aa gr. 60 Mixtis instilla. Acidi hydrochlorici, gtt. 30 Ferri sesquichloridi soluti, gtt. 20 Post agitationem admisce. Rad. Gentianæ pulv., Extracti Trifolii, aa gr. 40 Olei Cassiæ cinnam., gtt. 10 Rad. Althææ pulv., q. s. M. ft. pilulæ No. 120. S. As above.	<i>Vinum Anti-Cholericum.</i> R.—Tincturæ amaræ, “ aromatiçæ, “ Aurant. pom., aa unc. 1 “ Cassiæ cin- nam., unc. 2 Vini optimi, unc. 120 Sacchari albi, unc. 16 M. et solve. S. A small wine-glass to be taken four times a day during meals, com- mencing with lunch.
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We also call attention to Aqua Anti-Cholerica Meyeri, Potio anti-cholerica de Lovignac, and other preservatives in our *Manuale Pharmaceuticum*.\*

In using one of the above preservatives, a moral strength is gained which excludes all fear of cholera; and they are a strengthening support during the superabundance of business which visits those apothecaries' stores around which the cholera seeks its victims.

A moderate use of quinia, in small doses, for four or eight weeks, is without the least ill effect upon the health. The notion that it produces dropsy, is sheer superstition.

\* We copy from this work the formulas, &c., for both preparations :

<i>Aqua Vitæ Meyeri.</i> <i>Aqua Anti-Cholericæ Meyeri.</i> R.—Bacs. Myrtillor. rec., part. 18 Cort. aurant. expulp., p. 12 Cassiæ cinnam., p. 8 Radiciis galangæ, Radic. Zedoariæ, aa p. 2 Cardamomis, p. 1 Contusis concisisque affunde. Spir. vini rectificatiss., p. 600 Aquæ, p. 680 Digere per triduum et sæpius agita. Tum exprimendo cola. In colatura sedimentando, decantando filtrandoque depurate solve. M. Sacchari albi p. 120.	<i>Potio Anti-Cholerica de Lovignac.</i> R.—Quinia sulphatis, part. 2 Ferri iodidi, p. 1 Syrupi gummosi, p. 30 Aquæ destillatæ, p. 100 Misce et agita. S. Impetus cholæræ Asiaticæ quum accedit, dua cochlearia summantur, postea singulis horis singula cochlearia. Excretiones ubi cessare incipiunt et calor in corpus redit, caput glacie in linteo compressa legitur et ægroto aqua frigida porrigitur. J. M M.
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## QUINIA AS AN ANTISEPTIC.

Experiments made by Dr. Gieseler with fresh meat, showed that the preservative power of quinia (not sulphate) is much greater than that of many other substances, and suggested to him the idea of employing it in surgical cases. He saw favorable results in cases of gangrene, noma, decubitus, and even in diphtheritis; and they were the more marked, since, during his experiments, Dr. G. used also other remedies. Quinia may also be recommended after plastic operations, which frequently are without success on account of the decay of the transplanted parts; he has likewise used it locally, with supposed success, in caries and necrosis after performing the requisite operations. The remedy is used in the form of strong solution, with which compresses are to be wetted; or in considerable proportion mixed with fat; also in the form of linctus, gargle, &c.—*Hager's Pharm. Centralhalle*, 1865, No. 33, from *Zeitschr. d. Allg. Oesterr. Apoth. Ver.*, 1865.

## THE EFFECTS OF SOIL AND CULTIVATION ON THE DEVELOPMENT OF THE ACTIVE PRINCIPLES OF PLANTS.

BY THOMAS P. BRUCE WARREN, Préparateur in the Laboratory of Mr. William Hooper.

To the most casual observer, it is evident that plants which grow on one soil will not grow on another. It does not require an extensive knowledge of botany, to detect that the primary functions of plant life, though similar in all classes, vary in energy in different plants, and even in parts of the same plant: it is the adaptability of the organs for the performance of these functions, which establishes the locale of plant existence.

We are able, by certain means, so to modify the habits of a plant, as to cause it to grow under conditions which are not normally demanded by its nature, or the energy of its functions: from this remark, a plant may be said to be cultivated when grown under constrained conditions.

It would be difficult to define precisely the limits of cultivation, for the removal of a plant from a soil naturally selected by it, or on which it grows, as it were, *sua sponte*, to a soil

equally fitted for its peculiar habits, can hardly be considered as cultivation.

It is, however, more difficult to imitate nature on such a point, than to supply the exact pabulum for a plant, or to sustain those conditions under which a plant grows in a wild or natural state.

The circumstances which I proposed to consider, as affecting the medicinal value of a plant, are:—mutilation, when giving rise to an unnatural development of particular parts; effects of soil, as indicated by the chemical analysis of the soil and plant; and situation, with reference to the supply of air, light, and moisture.

The principle of mutilation is not generally practised, although by suppressing the development of flowers, a larger number of leaves may be obtained. In the case of the Labiatae, we may, by suppressing the development of wood, produce a larger quantity of oil, but it does not appear that by the mere removal of leaves, a larger quantity of oil is obtainable, more flowers are developed, but the yield of oil is proportionally diminished; this might possibly admit of explanation, from the importance of the functions which the leaves perform in regulating evaporation and supplying air, the main features in the elaboration of the vegetable fluids.

Mutilation will not in every case account for the non-development of any particular organ or part of a plant.

I planted about three years ago, but without determining the suitability of the soil, several slips of rosemary: they have all put out abundance of shoots and leaves, but the number of flowers has been very insignificant; no mutilation has ever taken place. At the same time I laid out several plants of lavender, which became completely exhausted after the second year, and out of forty slips planted at the same time, not one struck; this, I have since discovered, may be explained by the chemical condition of the soil (see analysis in Appendix), and the physical requirements of the plant.

Non-mutilated lavender plants yield considerably finer flowers, when grown on a suitable soil, but the quantity is much less than from plants in which the development of wood is pre-



vented, and the yield of oil is greater in the latter case; the same remark applies, though less forcibly, to peppermint and rosemary.

The injudicious mutilation of lavender plants, explain to some extent the great differences in the yield of oil obtained by different growers.

Mutilation, when practised, should be regulated by the season and exposure of the plant.

I am strongly of opinion that mutilation is not confined to the Labiatae, although I hesitate to include the result as arising from mutilation, rather than an indication of hybrid development; but it is a singular fact, that henbane plants, when cultivated, show a tendency to capitate inflorescence, whereas the same plants (self-sown) are strongly disposed to a racemose arrangement of its flowers, and in this case an enormous yield of flowers is produced compared with the quantity of leaves. The cultivated plants indicate more or less an axillary inflorescence, and the capitate disposition should perhaps be regarded as arising from an abortive development of the stem.

My experiments on henbane were far advanced when I first observed this, as it was only after flowering that I distinguished any difference in the plants.

In the case of plants, when the unexpanded flowers are gathered, as roses, it would be very desirable to determine whether any difference exists in the medicinal value of the flowers first collected during the season, and those which are gathered near the end, for it is evident that this imposes no less on the energies of the plant, than mutilation in the general acceptance of its principle, and I hope to return to this inquiry at an early period, to determine the difference, if any, which arises through the gradual though unavoidable exhaustion of the plant.

I have performed an extensive series of experiments on this point, to determine whether such plants as belladonna, foxglove, and henbane should be allowed to perfect their flowers or seeds before the leaves are collected for the preparation of medicinal extracts. I find that the amount of active principles contained in the leaves, remains the same both before and immediately

after flowering; it is slightly diminished in the stalks and roots after the fall of the flower, and gradually accumulates in the remaining appendages of the flower.

The maximum accumulation in the seeds and seed-vessels of foxglove and stramonium, I have found to be attained before the seeds change their color.

In the case of belladonna, this is not so strongly marked as in foxglove, henbane, or stramonium.

With good specimens of foxglove recently collected, it is easy to obtain the color reaction of digitaline, by simply moistening the seeds with dilute sulphuric acid.

These experiments have been confined entirely to the biennials, in some cases transplanted so as to be within easy access.

Although I have closely studied the effects produced by cultivation, and have prepared several artificial soils to determine the effects produced by differences of mineralizing ingredients, I regret that the information which may be deduced from my experiments is so limited. This is necessitated by the fact, that it is not easy to detect any differences in the mineral composition of the juices of a plant, which may be raised on soils having a slight difference in their mineral constituents; and since time is required for the indication of a maximum effect on the chemical constitution of a plant, and the degree of acceleration with which such effect is produced, and as my experiments have been limited to a single year, it is not right to infer that the results indicated form the totality of what might under the continuation of the experiment be expected.

There can be no doubt that the continual raising of medicinal crops upon any soil, without supplying the same with manure in some form, must be followed by an alteration in the chemical constituents of the plants; such effects can be determined only by experiments extending over three or four years. From the information which I have been able to gather, it is quite probable that the careful application of manure to medicinal crops is of essential importance, and that merely restoring the saline matter to the soil which had been extracted during vegetation will not maintain its productive capacity.

Most growers with whom I am acquainted adopt the princi-

ple of rotation, but the most experienced prefer supplying their land with rich stable manure after each crop. The principle of rotation is ultimately exhaustive, but by a judicious combination of both principles better crops are obtained, both in quantity and quality.

Plants which are disposed to hybridity should be frequently renewed from the seeds of the wild plant; in general, the appearance of medicinal plants under cultivation, as far as my opportunities have extended, show a decided absence of hybrid species. This, I think, is produced by selecting for propagation those plants which are symmetrical in their physical and botanical development.

I have been informed that the parings of horses' hoofs is, or was, extensively used at Mitcham for lavender and peppermint crops, and although they certainly contain a considerable quantity of phosphate of lime and nitrogenized matter, it is difficult to understand their suitability as a manure, unless, from their slow and gradual decomposition, the soil is kept in a more uniform condition for a much longer time. I have not been able to determine the absolute value of this dressing for oil-yielding crops, but as far as its application for producing lavender flowers for "bunching," it seems eminently suited. The grower who used this to the greatest extent did not cultivate lavender for distillation.

It has been stated that henbane and foxglove lose their activity by drying, in consequence of a reduction of their active principle. This I am not able to support. I find that their active principles, as well as those of many other plants, are rendered less soluble, from a modified state of combination being produced.

By imperfect drying, fermentation might arise which might alter the remedial value of any preparation from these plants; but experiments are still wanting to prove that active principles are capable of conversion by direct fermentation, or decay, and toxicologists assure us that organized structures are not able to transform into other compounds the elements which form the molecule of an alkaloid.

Many growers have informed me that they are obliged to let their crops stand until the supply from foreign growers is ready for the markets; the result is, that in many cases the plants are allowed to remain some time after flowering before the officinal parts are collected; and since my experiments are so strongly opposed to such practice being allowed, it has suggested itself to me that a plan which might remedy this would be for pharmacutists to insist that the plants should be supplied with their flowers, which would serve as a guarantee for the perfection of their condition.

It is much to be regretted that chemists, in determining the constituents of a plant, have overlooked the important relation which exists between the assimilative action of plants and the mineral constituents of the soil. In the case of plants supplied with highly nitrogenized manure, I have always found a much larger proportion of phosphates and nitrates, and variable proportions of soda salts; the latter can only be considered as arising from the manure. As such plants invariably yield a greater number of flowers, the analysis of the parts of the plant, if allowed to perfect its flowers, can only be complete when the proportions of its separate parts are only considered.

I met with a most singular illustration of how the mineral constituents of a plant may vary, in some foxglove plants, which, in order to facilitate my experiments, were transplanted in the early spring. These plants were taken from a wood near Wimbledon, with a portion of the soil for analysis. The soil consisted principally of decayed vegetable matter, and yielded on incineration about 9 per cent. ashes, of which 7 per cent. was soluble in water and dilute sulphuric acid, the remaining 2 per cent. consisted almost entirely of oxide of iron and silica. The complete analysis of these soils will be found in Appendix A.

The incineration of the leaves and stalks yielded about 4 per cent. ashes when taken from the soil referred to, and, after removal to a slightly manured soil, yielded nearly 10 per cent. ashes. The juice extracted from the leaves in July gave considerable quantities of phosphates, nitrates, and chlorides, with traces of sulphates. I analysed at the same time the juice ex-

tracted from the leaves of the plants growing on the original soil; it yielded larger proportions of chlorides and sulphates. The yield of ashes, on the incineration of the leaves and stalks, was about 6·3 per cent.

The analysis of the soil to which the plants were removed is given in Appendix B.

My experiments on belladonna, which have been confined to cultivated specimens, support the conclusion that very marked differences in the chemical composition of the soil gives rise in a corresponding degree to differences in the saline constituents of a plant, and that where the differences are but slight, no sensible difference is produced in the amount of mineral matter contained in the plant.

From the seeds of these plants I obtained :—Albumen, gum. inulin, phosphate of soda, nitrate of potash, chloride of potassium, sulphate of potash, an acid salt of atropia, malic and mucic acids, chlorophyll, and a peculiar principle,\* similar to chlorophyll.

Hot water extracts a very large proportion of phosphates and sulphates, which are readily deposited in a crystalline form. At different seasons the organic salts are found to offer the greatest variation; many are detected only after the fall of the flower. I could not detect mucic acid in any part of the belladonna plants except the seeds. The presence of malic acid in stramonium seeds increases after the fall of the flower, but is

\*This principle, I find, exists in the seeds of all plants on which I have operated; it differs from chlorophyll, first, in its solutions not becoming yellow on exposure to the air, and secondly, its insolubility in hydrochloric acid. It may be isolated by digesting the alcoholic extract in a mixture of hydrochloric acid and ether, and separating the supernatant solution, and allowing it to evaporate spontaneously. It then remains as a soft, oily substance, possessing the odor of the plant from which it is extracted.

M. Fremy has announced to the Academy of Sciences that he has found a substance in the leaves of plants which he regards as a modification of chlorophyll, and from its general properties I am inclined to think that it is identical with what I have found in the seeds and seed-vessels, but it certainly performs a different function here to that suggested by M. Fremy with regard to leaves.

## 52 EFFECTS OF SOIL, ETC. ON ACTIVE PRINCIPLES OF PLANTS.

also found in the juice extracted from the leaves. In nearly all cases the juices extracted from the seeds react much more strongly on litmus paper than the juices from the leaves or stalks, and it is a notorious fact that this acid reaction disappears by drying the plants.

The following is the percentage of active principles and salts obtained by my experiments from the following plants, grown under different conditions :—

Name and Condition of Plants.	Seeds.	Leaves.	Leaves, Stems, and Stalks.	Salts.
BELLADONNA ( <i>Atropa Bellad.</i> ) Highly matured.....	{ 4.5 } berries.	{ 4.3 }	3.8	12.0
Same under ordinary cultivation.....	{ 4.5 } berries.	{ 4.0 }	3.0	8.7
FOXGLOVE ( <i>Digitalis purpurea</i> ). Wild....	9.2	9.0	8.0	10.0
Same, transplanted to a rich soil, matured slightly.....	10.1	8.6	8.0	14.0
STRAMONIUM ( <i>Datura Stramon.</i> ) Self-sown from cultivat'd plants.	3.0 } without pericarp.	2.9	2.0	{ 2.9 } seeds and seed-vessels. .
Same, under cultivation.....	{ 3.0 } without pericarp.	2.0	2.5	{ 3.9 } seeds and seed-vessels.
HENBANE ( <i>Hyoscyamus niger</i> ) Cultivated.....	4.0	{ 3.6 } before flowering.	3.0	12.0 leaves and stems.
HEMLOCK ( <i>Conium maculatum</i> ) Wild.....	6.0	6.0	4.8	not determined.
DULOAMARA ( <i>Solanum Dulcam.</i> ) Wild.....	7.2	6.0	6.0	variable.
	Ripe berries.			

The effects produced by situation are of very great importance ; a proper supply of air and moisture should form the first consideration for oil-yielding crops, and the soil best adapted should contain a proper proportion of silica, alumina, and lime, which seems to me can only be determined experimentally for each crop.

The finest specimens of chamomile flowers are obtained by carefully laying out the plants in rows, not nearer to each other, on any side, than two feet. By allowing sufficient space, grow-

ers compensate for such plants which require a more exposed position than can be obtained in the general way of cultivation.

The tendency which some growers have of planting closely may explain the differences which have been observed in the medicinal effects of some plants, as foxglove and henbane. It is highly probable that growers have been stimulated to this practice by competitive impulse.

It is well known that plants which are secluded from light cannot perfect their seeds, nor effect the deoxidation of carbonic acid. As this results where the plants are situated closely to each other, especially if they have large leaves, it is highly probable that species may be produced. This may serve to explain the singular effect which I have already noticed in reference to henbane.

#### APPENDIX.

##### A. *Analysis of Soil from a Wood near Wimbledon.*

Chlorides, magnesium and potassium . . . . .	2.1
Sulphate of lime . . . . .	.3
Carbonate of lime . . . . .	3.5
Carbonate of magnesia . . . . .	1.1
Oxide of iron and silica . . . . .	2.0
Water (lost at 212°) . . . . .	12.0
Organic matter . . . . .	73.0
Loss . . . . .	6.0
	<hr/>
	100.0

##### B. *Analysis of Soil; vide page 213.*

Phosphate of lime, with traces of magnesia . . . . .	9.0
Chloride of potassium and sodium . . . . .	4.6
Sulphate of lime . . . . .	.5
Nitrate and phosphate of ammonia . . . . .	.7
Silica . . . . .	9.1
Oxide of iron . . . . .	1.1
Organic matter . . . . .	63.3
Water . . . . .	8.0
Loss . . . . .	3.7
	<hr/>
	100.0

## ANALYSIS OF SOIL FROM MITCHAM.

*Crops raised: Lavender, etc. Yield of Oil per acre, 8 lb.*

Carbonate and sulphate of lime	9.0
Carbonate of magnesia	3.8
Alumina	16.3
Silica	20.5
Oxide of iron	2.8
Phosphate of lime	6.0
Nitrate and phosphate of ammonia	3.0
Organic matter	23.7
Water (lost at 212° F.)	12.3
Loss	2.6

100.0

## ANALYSIS OF SOIL.

*Crops raised: Stramonium, Henbane, and Belladonna.*

Phosphate of lime	4.5
Carbonate of lime	12.0
Alumina	18.0
Silica	10.0
Carbonate of magnesia	2.1
Oxide of iron	3.5
Chloride of sodium	2.5
Nitrate of ammonia	1.7
Water	20.1
Organic matter	24.0
Loss	1.6

100.0

## ANALYSIS OF SOIL.

*Natural Soil.—Solanum Dulcamara.*

Sulphate of lime	2.0
Silica	36.0
Carbonate of lime	14.2
Alumina	9.5
Carbonate of magnesia	1.3
Oxide of iron	5.6
Water	12.4
Organic matter	15.0
Loss	4.0

100.0



## ANALYSIS OF ASHES.

*Leaves and Stalks of Foxglove.*

	Wild.	Transplanted.
Chloride of magnesium . . . . .	18.0	4.0
Sulphate of lime . . . . .	26.0	7.2
Phosphate of lime . . . . .	.4	8.0
Chloride of potassium . . . . .	16.0	0.9
Chloride of sodium . . . . .		6.4
Silica and oxide of iron . . . . .	33.6	64.0
Alumina . . . . .	.9	9.5
Loss . . . . .	5.1	
	<hr/> 100.0	<hr/> 100.0

## ANALYSIS OF SOIL.

*Referred to in page 51.*

Silica . . . . .	48.0
Oxide of iron . . . . .	7.2
Alumina . . . . .	12.9
Sulphate of lime . . . . .	1.5
Chlorides of potassium and sodium . . . . .	1.9
Phosphate of lime . . . . .	3.6
Organic matter . . . . .	10.9
Water . . . . .	9.0
Loss . . . . .	5.0
	<hr/> 100.0

—*Proc. British Pharm. Conf., in Pharm. Jour., Oct., 1865.*

## DIFFUSION OF FLUIDS BY THE ATOMIZER FOR THE PURPOSE OF DEODORIZATION AND DISINFECTION.

Dr. Richardson explained to the members of the British Medical Association a process he had adopted for applying the atomizer for the purpose of deodorization. He made a mixture by adding iodine to a solution of peroxide of hydrogen until saturation occurred, and afterwards concentrated sea-salt in proportion of  $2\frac{1}{2}$  per cent. In this combination a water was produced like sea-water, and which was rendered active by being charged with free iodine and ozone. The solution, placed in one of Krohne's hand atomizers, could be diffused in the finest state of distribution at the rate of two fluid ounces in a quarter

of an hour: but in an ordinary bed-room or sitting-room one ounce was sufficient to render the air so active that ozone test-papers were discolored by it to the highest degree of Moffatt's scale in from five to ten minutes. For charging the sick room rapidly and effectually with active air—in a word, with sea-air—Dr. Richardson said this plan was by far the most effective of any he had known. A nurse could put the apparatus into action at once, and could deodorize, hour by hour, according to the directions of the medical practitioner.—*Amer. Journ. Med. Sci.*, Oct., 1865, from *Med. Times and Gaz.*, Aug. 19, 1865.

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#### BEE BREAD AS A DIURETIC.

Dr. Jas. S. Whitmire states (*The Chicago Medical Examiner*, September, 1865) that he has found the bee bread\* to be a most powerful diuretic. He made the discovery accidentally. Having bought a quantity of honey in the comb, he feasted liberally on it with his family for four or five weeks, and noticed that his secretion of urine was largely increased. Fearing that his kidneys were diseased, he examined for albumen without finding any, and afterwards for sugar by the taste, when the taste of bee bread was detected, and its odor was also distinct. He then learned that his family was similarly affected.

To verify his suspicion as to the cause of his increased urinary secretion, he selected, he says, "some of the oldest comb that contained the greatest quantity of the bread, and separated it from the honey and comb; then, after abstaining a week from the use of my favorite sweet, and getting quite over my renal disease, as well as my unnecessary alarm, I partook of the bread, without the luxury of the honey, to the extent of 3j three times per day, when, as I was expecting, back came the enormous secretion, but this time producing an entirely different effect upon my mind, so that I was now prepared to investigate the effects a little more at length. I continued taking 3iij per day, for about a week, during which time I voided from four to six fluid pounds per day, the difference being the *greatest when I was at*

\* The pollen of flowers collected by bees as food for their young.—ED.

*some out-door exercise. When I remained quiet, in my warm office, there was from one to one and a half pounds less secretion than when exercising. I also repeated the same experiment on my children, and found, to my entire satisfaction, that this article possesses most valuable diuretic powers, and there seemed to be no disagreeable symptoms following its use, excepting a slight degree of flatulency and a looseness of the bowels produced, the latter of which is not, unfrequently, very desirable, particularly in dysuria, where there is irritation of the neck of the bladder and urethra, or, even in strangury, where there is absolute inflammation of the urinary passages. This, to me, is the more evident, from the enormous quantity of urine secreted, and, consequently, any irritating quality that it might contain would be so diluted as to be rendered entirely mild and inoffensive to the delicate structure of the urinary passages.*

“One advantage this article has over many others of its class is, that it is entirely palatable and inoffensive to the stomach, producing no irritation or nausea of the latter organ.”—*Amer. Journ. Med. Sci.*, October, 1865.

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#### ARMENIAN OR DIAMOND CEMENT.

This article, so much esteemed for uniting pieces of broken glass, for repairing precious stones, and for cementing them to watch-cases and other ornaments, is made by soaking isinglass in water until it becomes quite soft, and then mixing it with spirit in which a little gum mastic and ammoniacum have been dissolved. The jewellers of Turkey, who are mostly Armenians, have a singular method of ornamenting watch-cases, &c., with diamonds and other precious stones, by simply glueing or cementing them on. The stone is set in silver or gold, and the lower part of the metal made flat, or to correspond with the part to which it is to be fixed; it is then warmed gently, and has the glue applied, which is so very strong that the parts so cemented never separate. This glue, which will strongly unite bits of glass, and even polished steel, and may be applied to a variety of useful purposes, is thus made in Turkey:—Dissolve five or six bits of gum mastic, each the size of a large pea, in as much

spirits of wine as will suffice to render it liquid; and in another vessel dissolve as much isinglass, previously a little softened in water (though none of the water must be used), in French brandy or good rum, as will make a two-ounce phial of very strong glue, adding two small bits of gum albanum, or ammoniacum, which must be rubbed or ground till they are dissolved. Then mix the whole with a sufficient heat. Keep the glue in a phial closely stopped, and when it is used set the phial in boiling water. Some persons have sold a composition under the name of Armenian cement in England; but this composition is badly made; it is much too thin, and the quantity of mastic is much too small. The following are good proportions: Isinglass, soaked in water and dissolved in spirit, two ounces (thick); dissolve in this ten grains of very pale gum ammoniac (in tears), by rubbing them together; then add six large tears of gum mastic, dissolved in the least possible quantity of rectified spirits. Isinglass, dissolved in proof spirit, as above, three ounces; bottoms of mastic varnish (thick but clear), one and a half ounces; mix well. When carefully made, this cement resists moisture and dries colorless. As usually met with, it is not only of very bad quality, but sold at exorbitant prices.—*Lond. Chem. News*, Nov. 3, 1865, from *Tinman's Manual and Sci. Amer.*

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ON THE DETECTION OF METHYLIC ALCOHOL WHEN  
MIXED WITH RECTIFIED SPIRIT OF WINE, AND OF DIS-  
TINGUISHING BETWEEN ETHER AND SWEET SPIRIT OF  
NITRE WHEN PREPARED FROM PURE AND FROM ME-  
THYLATED SPIRIT RESPECTIVELY.

BY MR. W. YOUNG.

Aware of the great interest taken at the present moment in the above subject, I thought a few remarks, on a method I have adopted for some time for detecting the presence of methylated spirit, might prove acceptable to your readers; especially as not much time or trouble are involved in its application.

The evidence of the presence of methylated spirit in, or having been used in the preparation of, the above articles, is based on the change produced by it in the color of the solution of permanganate of potash.

The solution I use, and which, in what follows, will be spoken of as "the test," is made by dissolving 1 grain of crystallized permanganate of potash in 1 fluidounce of distilled water.

*Spirit of Wine.*—1. If 10 minims of the test be added to 4 fluid drachms of the purest rectified spirit in a test tube, the mixture will be found to retain the bright pinkish color so characteristic of permanganate of potash, for at least ten minutes, when it gradually fades. As regards color, this may be taken as a standard for comparison.

2. Add 10 minims of the test to 4 fluid drachms of the same spirit, previously mixed with two per cent. of wood naphtha. The difference between this and the pure spirit is at once apparent. The liquid no longer retains its characteristic color, but almost instantly changes to a dull pale-brown tint.

3. Add 10 minims of the test to 4 fluid drachms of pure spirit, previously mixed with ten per cent. of wood naphtha, as in methylated spirit. Here the change in the color of the test is even more striking, the liquid at once assuming the brown tint, as in experiment 2, only in a greater degree.

So great is the delicacy of the test, that 1 part of wood spirit in 300 of rectified spirit of wine may be readily detected by its aid; but I imagine it will be most valued in the next application I shall speak of,—viz.: to sulphuric ether, as no ready method has been published for distinguishing the pure from that containing ten per cent. of oxide of methyl, prepared from methylated spirit. The pure ether, used in the following experiment, was Howard's make.

*Sulphuric Ether.*—Take two clean, dry test tubes, put 4 fluid drachms of pure ether into one, and the same quantity of methylated ether in the other; place side by side, and add to each 10 minims of the test, mixed immediately before use with 50 minims of pure rectified spirit, to render it more readily miscible with the ether. The pure ether will retain the pinkish hue, imparted to it by the test, for a considerable time; whilst that made from methylated spirit changes to a pale brown in a minute or so. By adding successive portions of the test, the same effects will be observed, as the oxide of methyl appears

to possess the property of decolorizing a considerable quantity of the test.

*Sweet Spirit of Nitre.*—Previous to applying the test to this spirit, either pure or methylated, I proceed in the way described by Mr. Tuck, on page 173 of the *Pharmaceutical Journal* for October; best described in his own words:—"Mix the sweet nitre with an equal bulk of solution of caustic potash, twice the strength of the Pharmacopœia solution, and, after allowing the mixture to stand about an hour, distill off an amount of spirit equal to the quantity employed."

On proceeding, as in the former experiments, a most marked difference will be perceived, on the addition of the test, between the pure and sweet nitre and the methylated, the former retaining, the latter soon losing its color.—*London Pharm. Journ.*, November, 1865.

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#### THE SPONGE DIVERS OF CALYMNOS.

Some interesting details of the sponge trade of the Levant are given in Mr. Newton's recently-published narrative of his travels and discoveries. The island of Calymnos is celebrated for its sponge divers, who sail in a fleet of caiques for the coast of Asia Minor and Syria during the month of May, and fish up annually £16,000 worth of that valuable substance. The diver descends holding a flat stone in both hands to assist him in sinking, on which stone a cord is fastened. When he gets to the bottom he puts this flat stone under his arm, and walks about in search of sponges, putting them in a net hung round his neck as fast as he uproots them; he then pulls the cord as a signal, and is drawn up again. It is said that the best divers can descend to a depth of thirty fathoms, and that they can remain under water for as long a period as three minutes. From inquiries made by Mr. Newton, it does not appear that they are often cut off by sharks, though these monsters are not unfrequent in the southern part of the Archipelago. It is possible that the rapid descent of the diver may scare away this fish, who generally seizes his prey on the surface. A Calymniote told Mr. Newton that the most terrible sensation he had ever experienced

was finding himself close to an immense fish at the bottom of the sea. Under the root of the sponge is a parasitical substance of a caustic nature. This often bursts when the sponge is suspended round the diver's neck, and the liquid it contains causes deep ulcers in his flesh. Before exportation the sponges are cleansed and spread out in fields to dry. Acres of them may thus be seen exposed in fine weather. Sponges are sold by weight, and formerly the weight used to be increased by introducing a little sand. To prevent this fraud, the merchants insist upon their being filled with as much sand as they can hold, and as this amount can be accurately calculated, it is deducted from the gross weight.—*Lond. Chem. & Drug.*, Nov. 15, 1865.

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#### PHARAOH'S SERPENTS.

To the Editor of the Pharmaceutical Journal :

Sir,—A very curious toy is now being sold in Paris, under the name of Pharaoh's Serpent. As this toy really constitutes an interesting chemical experiment, perhaps an account of it may prove interesting to your readers.

It consists of a little cone of tin-foil, containing a white powder, about an inch in height and resembling a pastille. This cone is to be lighted at its apex, when there immediately begins issuing from it a thick serpent-like coil, which continues twisting and increasing in length to an almost incredible extent. The quantity of matter thus produced is truly marvellous, especially as the coil which so exudes is solid and may be handled, although, of course, it is extremely light and somewhat fragile.

Having a little of the white powder, with which the cones are filled, placed at my disposal by a friend, I submitted it to analysis and found it to consist of sulphocyanide of mercury. This salt, when heated to a temperature below redness, undergoes decomposition, swelling or growing in size in a most remarkable manner, and producing a mixture of *mellon* (a compound of carbon and nitrogen) with a little sulphide of mercury. The resulting mass often assumes a most fantastic shape, and is sufficiently coherent to retain its form ; it presents a yellow color on the ex-

terior, but is black within. The "serpent" shape of course results from the salt being burnt in a cone of tin-foil.

Both the mercurous and mercuric sulphocyanides decompose in the same manner; but the mercuric salt, containing more sulphocyanogen, seems capable of furnishing a larger quantity of mellon, and is the one used in the French serpents. A solution of pernitrate of mercury is readily precipitated by sulphocyanide of ammonium, and the mercuric sulphocyanide may be easily so prepared. It is best to use the mercurial solution as strong as possible, and to *keep it in excess* throughout the precipitation. Solution of perchloride of mercury is not so easily precipitated as the pernitrate, probably owing to the solubility of the mercuric sulphocyanide in the chlorides.

Perhaps I may be excused for adding that sulphocyanide of ammonium, suitable for the above purpose, may be very easily and economically prepared, as follows:—One volume of bisulphide of carbon, four volumes of liq. ammon. fort., and four volumes of methylated spirit are put into a large bottle, and the mixture frequently shaken. In the course of one or two hours the sulphide of carbon will have entirely dissolved in the ammoniacal liquid, forming a deep red solution. When this result is attained, the liquid is boiled until the red color disappears and is replaced by light yellow. The solution is then evaporated at a *very gentle heat* (about 80° or 90° F.) until it crystallizes, or just to dryness. The product is sulphocyanide of ammonium, sufficiently pure for the above purpose. One crystallization from alcohol will render it quite white.

One ounce of bisulphide of carbon yields, by this process, exactly one ounce of sulphocyanide of ammonium.

I am, etc.,

C. H. WOOD, F C. S.

—*London Pharm. Journ.*, Oct. 1, 1865.

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#### MANUFACTURE OF ARSENIC ACID.

Girardin suspends powdered arsenious acid in water, and passes chlorine into the mixture, by which he soon obtains a clear solution of arsenic acid in hydrochloric acid. By evapo-



rating this solution, a mass of arsenic acid containing no trace of arsenious is procured. As it is difficult to keep any considerable amount of arsenious acid in suspension in water, the author finds it better to make a saturated solution of that acid in hydrochloric, and pass the chlorine into such solution while hot. The stream of chlorine is stopped when a little of the fluid neutralized with potash no longer gives a green precipitate with bichromate of potash, thus showing that all the arsenious acid has been converted. The hydrochloric acid may then be recovered by distillation, and the syrupy solution of arsenic acid left in the retort evaporated.—*Lond. Chem. News*, Oct. 13, 1865.

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#### THE FLOWER FARMS OF FRANCE.

The growing of flowers for the production of fine essential oils and for medicinal purposes, is an important branch of horticultural industry in those departments of France bordering upon the Gulf of Lyons and the Mediterranean Sea, and especially in the southern portion of the Department of Var, adjoining the former Italian, but now French, province of Nice. There are extensive factories in Nismes, Montpellier, Morbihan, Nice, and some lately established across the sea in Algeria. Smaller establishments are found at Mentone, and all along the Genoese Riviera; but the great and acknowledged centre of this branch of industry is the town of Grasse, situated about seventy-five miles E.N.E. of Marseilles, a few miles inland, and its seaport Cannes, well known as the winter residence of Lord Brougham. It would be difficult to state, with any degree of accuracy, the product of the flower-fields of this interesting region. There are over sixty factories in Grasse, which is a flourishing place of 12,000 inhabitants, giving employment in the various departments of field and in-door labor, to fully 5,000 persons. Many manufacturers grow their own flowers, others buy them daily in the market, and still others are supplied by contract. The latter system prevails among the leading houses. Contracts are made, at a fixed price for a term of years, for the total product of a farm, at rates varying from 8 to 10 cents per kilogramme ( $2\frac{1}{2}$  lb.) of rose leaves, up to 1 dollar for tuberose leaves, and even

higher for violet leaves ; the latter being mainly produced at Nice. The average prices are about as follows :—Rose leaves 8 to 10 cents the kilogramme ; jasmine leaves, 40 to 50 cents the kilogramme ; orange leaves, 50 cents the kilogramme ; acacia buds, 60 to 80 cents the kilogramme ; tuberose leaves, 1 dollar the kilogramme ; violet leaves, 80 cents to 1 dollar 30 cents the kilogramme.

These are the leading garden-flowers used in Grasse ; only small quantities of the jonquil, narcissus, hyacinth, mignonette, etc., are produced. A great breadth of land is devoted to lavender, rosemary, thyme, sweet marjoram, cherry-laurel, sage, balm, and other medicinal and culinary plants, which are sold at much lower rates than the products of the above-named flowers.

The preparations derived from all these plants divide themselves into four classes :—essential oils, distilled waters, pomades and oils, and dried leaves and flowers. It is true that considerable quantities of extracts of the pomades are manufactured and sold, but they are generally of inferior quality, and will not compare with those produced by the great perfumers of Paris and this country.

The great bulk of essential oils produced consists of lavender, rosemary, thyme, sage, spike lavender, and sweet marjoram. The most valuable products, of any considerable amount, are the essential oils of Neroli and Petit Grain. The former is the result of the distillation of orange-flower water from the petals of the Bigarade or bitter orange (the sweet or Portugal orange yielding a somewhat inferior product,) and the latter is obtained from the green leaves of the same tree. The price of Neroli varies with the season from 30 dols. to 40 dols. the pound, of Petit Grain from 8 dols. to 12 dols. These two oils are used extensively in the composition of Cologne water, and in combination with bergamot and rosemary, give its distinctive character. The orange-flower water is consumed in immense quantities in France, in the “eau sucrée,” so universally drunk in the hot seasons ; this, by the way, is the only form in which a Frenchman will drink water at all.

The bigarade orange tree also furnishes a rough-skinned, bit-

ter, inedible fruit, from the rind of which is expressed an inferior oil called "essence bigarade," often used for adulterating the finer oils. The tree requires ten years to mature, and twenty to attain perfection, and yields an average of 17 lbs. of flowers per annum.

Rose-water is also distilled in large quantities. A result of its distillation is a very minute proportion of otto of roses of the very highest quality; it appears in small supernatant grains or drops, which are carefully skimmed off and rectified. It is superior to the famous Kizanlik or Turkish otto, and, like it, congeals at ordinary temperatures in beautiful, transparent crystals. I saw, at the celebrated manufactory of Mr. Antoine Chiris, who was in all things the leader of his profession, a bottle containing about three pounds, which he valued at 550 dols., or over 11 dols. the ounce. It is not an article of export, the quantity produced being very small, but is reserved for use in unfavorable seasons, or a failure of the flower crop, to give strength and finish to the pomades and oils. The "Rose de Mai" (*Rosa centifolia provincialis*), or double May rose, is the one universally grown.

Another very costly article, of which less than an ounce had been produced in Grasse at that time, is the essential oil of jasmine. Its existence in the flower was long and stoutly denied by the distillers, although they failed to prove what other principle caused its fine odor. In 1853, an Algerian chemist obtained a minute quantity, which cost him, we are informed, at the rate of 17,000 francs the kilogramme, or nearly \$100 the ounce. It has, since then, been produced at a cheaper rate, but still too dear for commercial purposes. The wild Arabian jasmine is grafted on the cultivated plant of the same species, acclimated, and bears for many years, if not winter-killed, yielding from 90 to 150 lbs. of flower-petals per thousand plants. It is closely trimmed in spring and deeply covered in winter. The caterpillar is its most formidable enemy.

A most important branch, and one in which great rivalry exists, is the preparation of perfumed pomades and oils, which have a two-fold use: first as bases for the finer kinds of hair oils and pomatums, and next as a medium for obtaining spirituous extracts for

the handkerchief and the toilet; such as Lubin's well-known "Extraits pour le mouchoir." Their preparation is the most curious and interesting feature of the Grasse establishments.

The pomade "body," which is prepared in winter, is composed of one part of beef-suet and two parts of beef-lard (except for jasmine and tuberose, which is mainly lard, hardened by mutton or veal suet), thoroughly hashed, washed in several waters, and, among the best manufacturers, washed several times in rose water to deprive it of all unpleasant odor, then carefully melted and stored away in huge tin cans, in airy, cool vaults, for use in the season of flowers. Another preparation, called "corps dur," or hard body, is made of beef-tallow only, and is used in the manufacture of stick pomatums. For the oils, the inodorous virgin olive oil is used, expressed from olives just before their maturity.

The busy operations of the year commence with the rose season.

There are two processes for impregnating the pomade body and the oils with the floral odors—one by infusion and maceration, the other by what is termed "enfleurage." The first is employed for the strong, less volatile odors of the rose, orange, and acacia; the latter for the sensitive, ethereal perfumes of the jasmine, tuberose, jonquil, and all the bulbous plants, which will not endure the application of even a moderate degree of heat.

And, first, by infusion. About 100 kilogrammes (220 lbs.) are put into a tin planished copper vessel, placed in a copper water-bath, melted at a low temperature, and charged, at daybreak, with a certain quantity of the freshly-gathered flowers, which are stirred constantly during the day or night, the mass being kept only warm enough to maintain a semi-fluid state. About midnight it is removed from the fire, poured into strong bags, made of fish cord, and subjected to heavy pressure in large perforated iron cylinders, standing vertically upon marble bed plates, which are gently warmed, to prevent the congelation of the exuding mass. Next morning fresh leaves are added, and the process repeated daily, until the desired strength of perfume is attained; the pomade is then poured into cylindrical tin boxes, and sealed up for shipment.

The oils are treated in the same manner as to maceration, but are filtered instead of being pressed.

The process of "enfleurage" is as follows:—Large numbers of "châssis, or sashes, are prepared, about  $2\frac{1}{2}$  feet long by  $1\frac{1}{2}$  wide, the frame itself being 2 inches wide and  $1\frac{1}{2}$  thick, holding a stout plate of ground glass, and resembling in construction a large school slate. Those for the oils are about 4 by  $2\frac{1}{2}$  feet, proportionately heavy, and, in place of the glass, have coarse iron-wire network. The large factories have several thousands of each of these frames.

Upon each side of the glass the pomade is thinly spread, and the surface is channeled or furrowed with a four-tinned square-pointed wooden fork, so as to present the utmost surface for the absorption of the odor from the flower-leaves, which are thickly sprinkled upon it. The frames are successively charged with flowers, and piled one upon another, up to the ceiling. The leaves, confined between two strata of pomatum, wither, and yield up their odorate principle, which is rapidly absorbed. Daily renewals of the flowers are made, until the proper strength is obtained. The perfume pomade is then scraped off gently, melted into a water-bath, and poured into cans.

In preparing the oils, coarse, heavy, spongy, cotton cloths, made especially for this purpose at Marseilles, are saturated with olive oil, and spread upon the netted frames; flowers are then strewed thickly upon them, and they are piled up in like manner as the pomade frames. When sufficiently charged with the odor, the oil is expressed from the cloths by powerful levers.

Many hundred-weights of flowers and herbs are dried annually, are variously used in medicine, in cookery, and in the composition of scent-bags, cachous, fumigating-pastilles for the sick chamber, and kindred compounds of the perfumer's art.

The Parmesan or double violet is grown mainly at Nice, under the shade of trees, and yields a delicate and delightful perfume. It was the favorite odor of the Athenians under Pericles, and is now one of the most fashionable scents of the Parisian *beau monde*.

The flower-farms receive the highest culture. Under-draining was not practised at the period of my visit, but great attention

was paid to irrigation. In some fields at Cannes there were complete networks of irrigating-tubes, substantially laid in cement. A constant warfare is waged upon insects, and each plant has its particular borer, grub, or bug. Continual vigilance is the price of success.

The heat in summer is intense, though tempered by the sea-breeze; and the winter is, at times, as rigorous as at Washington or Richmond.

Male labor costs 35 to 40 cents per day, and female 15 cents. —*Lond. Pharm. Journ.* Nov. 1, 1865, from *American Gardener's Monthly*.

## THE CROP OF OIL OF PEPPERMINT IN MICHIGAN.

BY FREDERICK STEARNS.

Referring to a paper on the culture and production of oil of peppermint presented to the Association a few years since, I beg now to offer the following statistics in regard to the annual crops for the four years of the rebellion.

The figures refer only to St. Joseph's County, the small quantity produced in a few other counties, on isolated plantations, not tending to increase them materially:

The crop for 1861,	.	.	.	.	15,000 lbs.
" " 1862,	.	.	.	.	18,000 lbs.
" " 1863,	.	.	.	.	24,000 lbs.
" " 1864,	.	.	.	.	11,000 lbs.
Average value per pound, 1861,	.	.	.	.	\$2.25.
" " " " 1862,	.	.	.	.	2.75.
" " " " 1863,	.	.	.	.	3.00.
" " " " 1864,	.	.	.	.	5.00.

1861, '2, and '3, were favorable years for its growth, and the enhanced price led to a greater production; while 1864 was more unfavorable; the drouth affected it, and there was not so much mint set on account of the scarcity of laborers.

Mint farmers, who would grow from 30 to 60 acres, now grow 5 to 10, though there are occasional large growers.

The quality of the oil averages about the same as indicated in the former paper; if any change, it is for the better.

The crop for 1865 promises to be still smaller than for 1864. Much of the mint was winter-killed; there was less new mint set than usual, and a worm has made its appearance which destroys it.

The growth of corn and other great staple products yielding more profit, afford indication that the growth of acres of mint is gradually, year by year, becoming less.

I have not obtained the average number of acres under mint growth for the four years named, otherwise the *pro rata* value could be given; but while the crop of 1863 was a large yield at a fair price, the crop for 1864 was less than half, at far greater cost for labor, and was spread over almost as much land.

New lands in St. Joseph's County have nearly doubled in value in five years. Labor that was plenty at \$15 per month previous to the rebellion, is now scarce at \$30.

The best of the oil of peppermint of Michigan finds its way into market through the Messrs. Hotchkiss, under their brand; the balance is sold in the New York market, through the commission merchants and brokers.

*Detroit, Sep. 1st, 1865.*

—*Amer. Pharm. Assoc., 1865.*

## NATIVE WINE FROM THE GARDEN RHUBARB PLANT.

BY FREDERICK STEARNS.

An enterprising gentleman, of Belvidere, Illinois, Mr. J. R. Mudge, having introduced into market, during the last four or five years, a new native wine, made from the garden rhubarb, I offer the following in regard to its culture and manufacture, as obtained from him.

The growth of the plant for wine making was commenced in 1858, from what is termed the "strawberry variety," and has been continued ever since with continually increasing crop. The first crop was 1500 gallons, from that to 4000 gallons in 1864, while this season's crop is over 10,000 gallons.

When mature, the plant being cut, the juice is expressed, just as corn juice is obtained, and an equal bulk of water being added, with seven pounds of sugar to each gallon, is passed through

two vinous fermentations. When three years old it is fit for market. Its alcoholic strength varies from seven (7) to ten (10) per cent., according to its age.

Its flavor is pleasantly vinous, sweet, and similar to foreign sherry. Its peculiar medical value lies in an aperient property, aside from its alcoholic tonic power, a gentle movement of the bowels usually following its free use.

It is marketed by Mr. Mudge in glass, and in 10, 20, and 40 gallon casks. Value, \$3 per gallon.

*Detroit, Sept. 1, 1865.*

*—Amer. Pharm. Assoc., 1865.*

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#### ON ESCHWEGE'S PATENT WOOD NAPHTHA, AND ITS USES IN THE ARTS AND MANUFACTURES.

BY MR. JOHN TUCK.

In a paper published in the "Pharmaceutical Journal" for January, 1863, I drew the attention of pharmacutists to what was at that time a new and remarkable spirit patented in this country, and known as "Patent Pure Wood Spirit," or "Patent Pure Wood Naphtha," samples of which were shown at the late International Exhibition.

This spirit was as odorless as ordinary spirit of wine, and as free from any disagreeable taste. It was, in fact, so totally unlike the ordinary wood-spirit or naphtha of commerce, that I felt it to be my duty to ascertain positively that it was one of the many products of the destructive distillation of wood, before making any extended trials of its solvent powers on various bodies. I should, perhaps, here state that naphtha or wood spirit can, when not mixed with fermented spirit, be readily detected by means of oxalic acid, the naphtha being converted into crystals of the oxalate of oxide of methyl, solid at all ordinary temperatures, whilst fermented spirit is by the same treatment only converted into a liquid, heavier than and a little soluble in water. On submitting this new spirit to the action of oxalic acid, the formation of these crystals of methyl-oxalic ether thoroughly proved it to be wood spirit with which I had to deal.

This patent wood naphtha is obtained from the commercial



article by largely diluting it with water, filtering the diluted spirit through large cylinders of granulated charcoal, and then distilling, some portions of the first and last runnings being rejected. It is finally rectified, and sent into commerce as a nearly absolute spirit.

Since the publication of my former paper, I have made many trials, on a larger scale, of the pure wood spirit, and find its solvent powers to be remarkably similar to fermented spirit, so that it will become of very great importance in those arts and manufactures requiring spirituous menstruums, free from any disagreeable smell, and capable of dissolving the gums, resins, oils, alkaloids, etc., etc., used in their various processes. Ordinary crude naphtha was formerly almost always used in the making of French polish, and for dissolving the lac used in stiffening the basis of silk hats, and in the manufacture of spirit varnishes generally. The great reason for naphtha being so extensively used, and its disgusting odor and injurious effects on the eyes and body generally being submitted to, was on account of the enormous price of fermented spirit, the only other solvent that was at all available—the price of naphtha at this time being about nine shillings, and fermented spirit, nineteen shillings the gallon. In many cases, this high price of fermented spirit operated very injuriously upon the British manufacturers, especially in cases where the lower-priced naphtha could not be used on account of its abominable odor. This evil became, at length, so great, that, as is well known, the Legislature wisely permitted methylated spirit, or spirit of wine, duty-free, to be used, it being, however, first mixed with ten per cent. of ordinary naphtha, in order to render it unfit for use as a beverage, and thus prevent injury to the revenue.

Although this was a very wise and liberal measure, and a great boon to many arts and manufactures, still there are others to which it is of no service whatever. The odor of ten per cent. of ordinary naphtha is, and even if it were only one per cent., would be quite sufficient to effectually shut it out from being used in perfumery, in making the various flavoring essences, and the finer kinds of spirit varnishes. Piesse says, in his "Art of Perfumery," speaking of transparent hard soap,—“Until the

Legislature allows spirit to be used free of duty for manufacturing purposes, we cannot compete with our neighbors in this article; the methylated spirit has such an abominable odor that it cannot be used for making scented soaps for the toilet." It would, indeed, be a great boon to pharmacutists, as well as perfumers, and I heartily wish that some plan could be devised, whereby a spirit of wine, without disagreeable odor or injurious admixture, might be allowed duty free for their respective uses. I feel convinced, too, that the Board of Inland Revenue would be in favor of such a measure for a duty-free spirit, if we could first prove to them that the revenue would not be injured thereby, and in this lies the difficulty.

Pharmacutists require a duty-free spirit, without disagreeable odor or any admixture which would prove injurious, when the mixed spirit was taken internally, in quantities of at least half an ounce.

Perfumers and others require a duty-free and odorless spirit, but it is not absolutely essential for it to be free from injurious admixture when taken internally.

The Board of Inland Revenue, on the other hand, will only sanction a spirit of wine being duty-free, conditionally upon something being added to it, so as to render it totally unfit for the purposes of a beverage. Another condition is, that such addition to the spirit shall be a permanent mixture, and not removable by any known process, method, or operation.

Now, I think it will be plain to all, that these conditions, as regards pharmacy at least, are extremely difficult of realization, if not impossible, so that I fear we must still continue to use a duty-paid spirit. Although it may not, perhaps, ultimately be an extremely difficult task to not only find a method of rendering fermented spirit thoroughly unpotable, but incapable of being made so, and at the same time adapted for fine varnishes and perfumery, it nevertheless is not at all probable at present.

It is in meeting these hitherto unsupplied requirements of perfumery, varnish-making, etc., etc., (none of which were benefited in the least by methylated spirit,) that the patent wood naphtha has become of so much importance, all the essential oils, odorous substances, resins, gums, etc., being as soluble in it, and in some

cases even more so than in spirit of wine. In my former paper I gave a list of more than twenty essential oils I had dissolved in it; since then I have tried its solvent action on many other essential oils and substances used in perfumery, and the general conclusion I have come to concerning it is, that it is a most valuable menstruum, and one well worthy the attention of perfumers and others requiring a spirit for its solvent action. I have made several compound perfumes, using only the patent wood naphtha as a solvent,—amongst them have been lavender water, verbena, eau de Cologne, the “favorite,” etc.; and I have pleasure in placing samples of the perfumes so prepared before the Conference, and some specimens illustrating the purification of the crude naphtha,—No. 1, being the mixture of oily hydrocarbons obtained by diluting the naphtha with water, and found floating on the surface of the diluted spirit; No. 2, obtained by distilling the charcoal used in the purification of the diluted spirit; No. 3, the finished patent wood naphtha, as sent into commerce.

For making transparent soaps, as far as my experiments permit me to give an opinion, it will be found to answer in every respect as well as fermented spirit—curd, Castile, and other soaps being just as soluble in it. It will be in the recollection of some here present, that a few years ago ordinary wood-naphtha was given and recommended extensively in the treatment of phthisis, and now that it can be obtained free from odor and disagreeable taste, its medicinal action upon the system would form a very interesting inquiry. In cases of painful inflammation, headache, etc., etc., the “Patent Wood-spirit” makes a far better evaporating lotion than spirit of wine in the same proportions, on account of its greater volatility, its boiling-point being much lower. To the naturalist it affords a new and valuable agent for the preservation of his animal and vegetable specimens, being free from the faults that attend the ordinary naphtha. It also promises to be of the highest importance in photography; from some experiments detailed lately in one of the photographic journals, gun-cotton is more soluble in it than in sulphuric ether, and I have seen a good picture taken upon collodion so prepared. The patent wood-naphtha collodion will prove a great boon to photographers in India and warm

climates, where the ordinary collodion frequently boils as it is poured on the plate. In conclusion, I have made no satisfactory experiments upon the physiological effects of the patent wood-spirit nor the ethers prepared from it upon the human system. I think there is a large field here open for the investigations of the physician, for undoubtedly some of them will prove to be most powerful agents in the treatment of diseases.

Wilton, near Salisbury, August 21, 1865.

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Mr. Tuck said that, since his paper was written, the authorities had stopped the manufacture of Eschwege's patent wood naphtha, but it was to be hoped that perhaps, under certain regulations, its production would be continued.

This was also the general opinion of the meeting.—*British Pharm. Confer. in Lond. Pharm. Jour., Oct. 1, 1865.*

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#### ON A METHOD OF DRYING GLUTINOUS SUBSTANCES.

A large number of substances, like gum, &c., have, as is well known, the property of conglomerating, upon drying, into amorphous masses, more or less solid and translucent, by which, on the one hand, the original appearance of the freshly-made preparation is lost, and, on the other, complete dessication rendered very difficult. In order to obviate this adhesion of the elementary particles occurring during the drying of such substances under ordinary circumstances, Reischauer has proposed to carry on this operation out of contact with the atmosphere, and by the aid of a suitable ethereal medium. The apparatus employed for this purpose is, in its simplest form, a well-closed glass vessel filled with ether or a similar liquid, at the bottom of which is placed the chloride of calcium, quicklime, calcined sulphate of copper, &c., intended to absorb the water. A shallow vessel is placed below the surface of the liquid for the reception of the substance to be dried. The *modus operandi* is now a very simple one. The ether continually yielding its water to the chloride of calcium, constantly withdraws it in turn from the substance to be dried,

until, finally, the latter corresponds in its hygroscopic state with that of the desiccating agent. The thorough wetting in this manner, of the constituent particles of the substance to be dried, which of course must be those insoluble in an ethereal liquid, prevents their sticking together, and the original appearance is retained when dry.

Gum separated by precipitating the aqueous solution with alcohol, gives an amorphous white mass of very slight adhesiveness, and with no trace of the common glass-like condition. The so-called diastase, or the body obtained by precipitating the extract of malt with alcohol, deprived of water under ether, forms spongy and very light granules. In this state it retains its effect upon starch. The microscopical examination of starch paste dried by this process leaves scarcely a doubt that the starch grains exist in paste in a state only of extraordinary expansion, and not in that of actual solution. Hops give a mass similar to diastase, but, however, no longer capable of producing fermentation.

The organs of plants dry rapidly under this treatment, commonly retaining their color, unless unusually delicate. Taken from the ether, they soon become moist again in the air, and rapidly lose their color, which, by a continuance in the liquid, appears remarkably fine.

The behaviour of animal productions under this method of drying is of especial interest. It may be remarked that, generally, while vegetable matters are distinguished by their great brittleness in the dry state, those of animal origin are characterized by a remarkable toughness, which reaches its highest degree in the fibrous formations of the skin. The pliability of thick skin dried in ether over chloride of calcium is very extraordinary. Other animal preparations at the same time preserve their original form in the dry state, the usual contraction of the parts being thus avoided. The whole intestines of a young dog, treated in this manner, formed a remarkable anatomical preparation, in which the delicate structures were preserved in the most complete manner upon drying. The lungs and liver, to preserve which vain attempts have hitherto been made, formed a light spongy mass, retaining completely

their organization. It is more than probable that anatomists can make use of this process in many cases; as, for instance, in the microscopical examination of the kidneys, pancreas, &c., and particularly in those which have hitherto required the solidification of the object by chromic acid, &c. The use of the ether in a liquid form is frequently not necessary. The skin of animals, animal membrane, &c., readily assume, in an atmosphere saturated with the vapor of ether, containing a suitable, strongly hygroscopic substance, a condition similar to that of white dressed leather. A like satisfactory result, however, is not obtained in the desiccation of inorganic substances, oxide of iron, alumina, &c., in artificial media.

It is obvious that this process may be rendered useful, under suitable modifications, for other purposes. It is a ready method, according to Reischauer, for removing acid bodies soluble in ether from their aqueous solutions, by putting them into an ethereal liquid with caustic lime or potassa.—*Zeits. Anal. Chimie* from *Dingl. Polyt. Journ.*

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#### REMARKS ON EXTRACTS OF MEAT.

BY HENRY B. BRADY, F. L. S., ETC.

(This was a short verbal communication, of which the following is as full a report as can be furnished.)

The author stated that he should not have ventured to occupy the time of the Conference, already over-crowded with business, still less would he have intruded on the regular order of written papers, but for the concluding remarks in the President's address, and the desire which had been expressed by several members that he should open the subject for discussion at that sitting.

There were several forms in which the soluble extractive of meat had been used, either for general dietetic purposes, or for the convenience of the sick-room: the most important were those obtained from beef, and he would confine his remarks to them. Firstly, there were the fluid preparations represented by Gillon's "essence of beef;" secondly, those of gelatinous consistence, of which excellent examples were largely sold by one

or two London manufacturers, to which class also belonged the so-called "osmazôme glacée;" thirdly, the more permanent soft extractive, free from gelatine, known as "extractum carnis, Liebig;" and fourthly, a somewhat similar article, thickened with starchy matter, and evaporated further, so as to form lozenges or tablets. On each of these, he would say a few words:—

Gillon's "essence of beef" was, he believed, exactly what the makers professed, a carefully prepared beef-juice, having many advantages over anything that had preceded it for use in the sick-room. There were, however, drawbacks in connection with it; it was insipid, variable in strength, contained a good deal of gelatine, and did not always agree with invalids; still, it was a convenient and valuable basis for beef-tea, and it was fortunate that, with the present uncertain supply of other meat-extracts, there was anything so reliable to be obtained, even at a somewhat advanced price.

Of the gelatinous preparations, he had only seen the "concentrated beef-teas," prepared by Messrs. Fortnum and Mason and Messrs. Brand & Co. These were supplied of the consistence of firm jelly, done up in skins, each weighing half a pound to a pound. They appeared to be, essentially, extracts of beef containing the gelatine, and, when fresh, answered well for the preparation of beef-tea. The great objection to them was the difficulty of keeping them; in a damp place, the bladders moulded on the outside; in a dry place, the jelly lost water, and after a time became quite hard, and about the texture of glue, in which condition it was dissolved with great difficulty. The price, too, was against their general introduction. Recently, a material of somewhat similar character had been largely imported into France, from Rio Grande, under the name of "osmazôme glacée," of which he regretted that he had not yet been able to procure a sample, but it appeared from all accounts to have the worst qualities of this somewhat objectionable form of extract.

The third substance in order, the so-called "extractum carnis," of Liebig, might be said to have been introduced to the notice of the public in this country by a paper in the "Popular Science Review" for April, 1865, and, within a short time, the

article itself was offered for sale in London, in small quantities, at a high price. Its recent commercial history was probably known, by dire experience, to all present—its very excellence seemed to be the likeliest cause of its failure in a commercial point of view. The demand had been excessive; the supply, hitherto, had been very limited. The process employed in its manufacture had been suggested some years ago by Baron Liebig, though it had, until recently, only been carried out on a comparatively small scale. In the Royal Pharmacy, at Munich, it was still prepared to a considerable extent, under the direction of Professor Pettenkofer, and, indeed, they had a ready sale for all they could make at the somewhat high price of a florin and twelve kreutzers (a little over two shillings) per ounce. The process as settled by Liebig and Pettenkofer had been adopted in the Bavarian Pharmacopœia, and was closely followed in the laboratory at Munich. It was pretty much as follows, speaking from memory:—

Five pounds of fresh beef, cut very small and deprived of bone, tendon, and fat, were digested at  $212^{\circ}$  (in a steam pan) for an hour in ten pounds of water, and the liquor separated by strong pressure; the residue again digested in a similar way with the same quantity of water, and again subjected to pressure. The mixed liquids were evaporated to about three pounds weight, and allowed to cool; after standing, the fatty matter was skimmed off, and the evaporation continued until an extract of ordinary consistence was obtained. Ten pounds of meat should yield six ounces of extract. A specimen of extract so prepared, given him by Professor Pettenkofer during a recent visit to Munich, was on the table, and it would be found to possess, in a high degree, the qualities sought in such a preparation. The process originally devised, which depended only on heat and strong pressure for the exhaustion of the meat, had been found wasteful in practice, and had been discontinued in favor of the use of water, as in the formula given.

The large numbers of wild or semi-wild cattle slaughtered in South America for the sake of their hides and fat, suggested an obvious source for the cheap production of such an extract, and though long neglected, the matter had been recently taken up



by Herr Giebert, a German civil engineer, resident in Uruguay. This gentleman, after consulting Baron Liebig, and receiving personal instruction in the mode of preparation from Professor Pettenkofer, had established works on a considerable scale in Uruguay, from which all the extract which had come to this country had been derived. The specimens were excellent, though, it must be confessed, not quite equal in point of flavor and consistence to that prepared at Munich, but there seemed no reason why it should not become so after longer experience in its manufacture. The difference between the two was chiefly attributable to faults in its preparation, which were by degrees being remedied. The *nature* of the extract obtained from the flesh of semi-wild cattle did not differ from that obtained from domesticated oxen; it was, however, singular that the *proportion* of extractive matter to flesh was greater in the latter than in the former. Thus, the flesh of wild cattle yielded about three per cent. of extract; that of domesticated oxen about three and eight-tenths per cent., or about one-fourth larger quantity.

He should say very little on the purely chemical portion of the subject; for, though he had made a considerable number of experiments, hoping to determine some of the chemical questions which arose, he had been compelled to leave them in a half-finished condition. The extract was soluble in boiling water, about one-half soluble in alcohol, and partially soluble in cold water. It appeared to contain creatine, potash, lime, and magnesia, with phosphoric and lactic acids. The insoluble residue, after treating with cold water, appeared to be chiefly creatine and phosphate of magnesia. When examined under the microscope, the extract showed large crystals of creatine and phosphates. One very singular point in connection with it was the enormous number of bubbles of gaseous matter held in suspension; even heating the extract of the boiling-point seemed to make but little difference in this respect. Whether these were attributable to air mechanically diffused through it by the constant stirring during its evaporation, or whether they were the results of some slow decomposition (nitrogen or carbonic acid), he was not able to say, but he was inclined to the latter belief.

In respect to its nutritive properties, it had been disputed

that the *Extractum Carnis* was equal to the amount of beef which it was supposed to represent, *i. e.*, to thirty times its own weight. For a person in full health, the fibrous portion of the flesh was probably required as plastic material, or, at any rate, as a diluent for the extractive matter; but the case was far different with invalids; and, probably, no food which had been proposed was of equal value in preventing the waste of the tissues during illness. Professor Pettenkofer had spoken of the extraordinary effects of a mixture of a strong solution of the extract, with wine, as a restorative after severe accidents, and of the striking statistics obtained by himself and Baron Liebig in the convalescent wards of the Royal Military Hospital at Munich, which seemed to indicate that, under the free use of the extract, the period of convalescence was reduced to one-third of the duration common under the old regimen. The mere quantity of phosphates and chlorides contained in the extract, upon which so much stress had been laid by some, was not enough to account for these facts. That the extractive matter was the most important nutritive portion of flesh was also shown by the circumstance that dogs fed upon the exhausted fibrine rapidly starved.

If the *Extractum Carnis* could be procured in quantity, it seemed likely to be of incalculable value as an addition to the somewhat limited dietary of sea-going vessels on long voyages. In salted meats, the potash salts were replaced by the chloride of sodium, and to this cause the prevalence of scorbutic diseases was, with fair reason, assigned; but this preparation would supply the deficiency, and thereby conduce to the health of the seamen.

The author trusted that, at no very distant time, the present uncertainty in the supply might be obviated by the manufacture being carried on in many other parts of the globe where there was large trade in hides. Our own great colony of Australia ought not to be behindhand in the matter; and when it was known that the comparatively valueless flesh of wild or semi-wild cattle might be turned by a simple process into a remunerative article of commerce, the supply must surely keep pace with the demand.

Allusion was lastly made to the "Extract of Beef Lozenges," made by Messrs. Gillon & Co. They appeared to be the fluid essence of beef, made by the same firm, evaporated down, and sufficient starch or flour added to render them of suitable consistence for cutting into tablets. The addition of starchy material was requisite, as the continued evaporation could not be carried on without danger of decomposition, and the extract was, to some extent, hygroscopic, unless mixed with drying matter. Like the fluid preparation, the lozenges contained a good deal of gelatine, and a gluey smell and flavor was evolved on evaporating a solution of them. They could scarcely be considered of much practical importance, though their sustaining virtues had been exalted by some Alpine Club men, who had used them in long mountain journeys.—*Proc. Brit. Pharm. Conf. in Lond. Pharm. Journ., Oct. 1, 1865.*

[NOTE.—*Borden's Extract of Beef.*—The importance of reliable information in reference to the extracts of various kinds representing beef, whether liquid or solid, is so apparent, that we re-publish the remarks of Mr. Brady with satisfaction, as giving a good general view of the several forms used in Europe. It should be recollected, however, that Mr. Gail Borden, one of the pioneers if not *the* pioneer in popularizing this species of diet, produced his "meat biscuit" as early as 1849, and obtained for it a Council medal in 1851, awarded by the judges at the great International Exhibition at London. Since that time Mr. Borden has, in various ways, occupied himself in the same direction, as, for instance, in the preparation of Borden's Preserved Milk, now widely known. Latterly he has gone extensively into the business of preparing a solid extract of beef, analogous to Liebig's "Extractum Carnis," but with the albumen retained, the evaporation of the meat juices being conducted in vacuo at a low temperature, on the plan of making the "preserved milk." No salt or condiment is added, so that the extract represents twenty times its weight of fresh beef of prime quality. To secure the latter quality in the raw material Mr. Borden has established his works in the prairie country of Illinois, where cattle can be obtained cheaper than in our Eastern pastures, and of unexceptionable quality. In fact, experiment has convinced Mr. Borden that the juices of beef raised in that region, and not subjected to the depletion consequent upon being driven to an eastern market, are richer in extract than such Eastern beef as would be available for this purpose. We have tried this extract ourselves, prepared for use according to directions accompanying, which simply require boiling water, salt and condiment to taste, and have been favorably impressed with its qualities. As

first obtained it is elastic like rubber, of a reddish brown color, and with a slight, rather inviting odor. It hardens by exposure, loses its elasticity, and is covered by a very slight whitish efflorescence without any indications of being hygroscopic. The temperature at which the process of extraction is carried on, prevents the coagulation of the albumen, which is therefore retained in the extract along with the organic and mineral salts proper to flesh juice, and which swells the aggregate yield practically to about 5 per cent., a desideratum not found in the "Extractum Carnis," (see page 83). We have noticed none of the gluey odor, alluded to by Mr. Brady, in Borden's extract. But little if any gelatine is present in this extract, as in some of those used under the name of portable soup, and which swell the quantity of extract representing a given weight of animal food very considerably. Mr. John Currie, of New York, well known as a chemist, is associated with Mr. Borden in this enterprise, and contributes his practical knowledge in favor of a careful conduction of the manufacture. We hope our physicians will give this extract a careful trial in the numerous cases where dietetic aid of this kind is so important in the recuperative process after the wasting effects of disease, and we doubt not, so long as it is prepared in the careful manner and on the correct principles of the present process, from sound beef, that it will give ample satisfaction.

The form in which we have seen Borden's Extract of Beef, is in rectangular masses, three by one and a half inches and half an inch thick, weighing two ounces and representing two pounds and a half of fresh beef. Directions for use by the sick, and for the table, accompany the packages.—ED. AM. JOURN. PHARM.]

## ON THE NUTRITIVE VALUE OF "EXTRACTUM CARNIS."

BY JUSTUS LIEBIG.

I see that rather contradictory views are expressed by different English writers on the value of the Extract of Meat, some taking it to be a complete and compendious substitute for meat, whilst others assert that it has no nutritive value whatever. The truth, as is usually the case, lies in the middle; and, as I was the first who entered more fully into the chemistry of meat, I may be allowed shortly to state the results of my investigations, as far as the Extractum Carnis as a nutriment is concerned.

Meat, as it comes from the butcher, contains two different series of compounds. The first consist of the so-called *albuminous* principles (*i. e.*, fibrin and albumen) and of glue-forming membranes. Of these, fibrin and albumen have a high nutritive value, although not if taken by themselves. The second series consists of crystallizable substances—viz., creatin, creatinin,

sarcin, which are exclusively to be found in meat; further, of non-crystallizable organic principles and of salts (phosphate and chloride of potassium). All of these together are called the *extractives of meat*. To this second series of substances beef-tea owes its flavor and efficacy; the same being the case with Extractum Carnis, which is, in fact, nothing but solid beef-tea—that is, beef-tea from which the water has been evaporated. Besides the substances already mentioned, meat contains, as a non-essential constituent, a varying amount of fat. Now, *neither fibrin nor albumen* is to be found in the Extractum Carnis which bears my name; and gelatine (glue) and fat are purposely excluded from it. In the preparation of the extract, the albuminous principles are left in the residue. This residue, by the separation of all soluble principles, which are taken up in the extract, loses its nutritive power, and cannot be made an article of trade in any palatable form. Were it possible to furnish the market at a reasonable price with a preparation of meat, combining in itself the albuminous together with the extractive principles, such a preparation would have to be preferred to the Extractum Carnis, for it would contain *all* the nutritive constituents of meat. But there is, I think, no prospect of this being realized. Happily, the albuminous principles wanting in the extract of meat can be replaced by identical ones derived from the vegetable kingdom *at a much lower price*. Just the reverse is the case in regard to the *extractive* matters of meat, for (their salts excepted) it is impossible to find any substitute for them. On the other hand, they may be extracted from the meat and brought into the market in a palatable and durable form. In conjunction with albuminous principles of vegetable origin, they have the full nutritive effect of meat. From the extractive matters, then, contained in Extractum Carnis in a concentrated form, the latter derives its value as a nutriment for the nations of Europe, provided it can be produced in large quantities, and at a cheap rate, from countries where meat has no value.

The albuminous principles of vegetable origin are principally to be found in the seeds of cereals, and the European markets are sufficiently provided with them. On the other hand, the

supply of fresh meat is insufficient, and this will get worse as the population increases. For an army, for example, it will not be difficult to provide and store up the necessary amount of grain or flour. Sugar, too, as well as fatty substances and the like, will be procurable, their transport and preservation offering scarcely any difficulty. But there may easily occur a deficiency of fresh meat. Salted meat but inadequately replaces fresh meat, because, in the process of salting, a large quantity of the extractive principles of the meat are lost; besides, it is well known that those who live on salt meat for a continuance become subject to different diseases. Dried meat generally means tainted meat scarcely eatable. Extractum Carnis, combined with vegetable albumen, enable us to make up the deficiency, and that combination is the only one at our disposal. What was said of an army also holds good of those European nations in general that do not produce a sufficiency of meat. By making the most of the herds of South America and Australia, in using them for the preparation of Extractum Carnis, and by the importation of corn from the West of United States and other corn-growing countries, the deficiency may be made up, although not to the full extent. For, supposing ten manufactories, producing together ten millions of pounds of extract of meat from a million oxen or ten millions of sheep, that whole quantity would provide the population of Great Britain only with *one pound yearly* for every *three persons*—that is, *one pound a day* for every 1100 persons.

I have before stated, that, in preparing the extract of meat, the albuminous principles remain in the residue; they are lost for the nutrition, and this certainly is a great disadvantage. It may, however, be foreseen that industrial ingenuity will take hold of this problem and solve it, perhaps by a circuitous road. For if this residue, together with the bones of the slaughtered beasts, be applied to our fields as manure, the farmer will be enabled to produce a corresponding quantity of albuminous principles, and to better supply our towns with them, either in the shape of corn or of meat and milk. Made into a marketable state, it may hereafter replace the Peruvian guano, which very soon will disappear from the market.

On the value of extract of meat, as a medicinal substance, it is unnecessary to say a word, it being identical with beef-tea, about the usefulness and efficacy of which opinions do not differ. At the same time, I may remark that it is a mistake to think that beef-tea contains any albumen—that there ought to be any gelatine or drops of fat to swim on its surface. Beef-tea does not contain any albumen, and, if rightly prepared, ought to be free from gelatin (or glue), whilst the supernatant drops of fat form a non-essential and, for many, an unwelcome addition.

I should be glad if these lines could assist in clearing up public opinion on the value of extract of meat as a nutriment; my aim being, on the one hand, to reduce to their right limit hopes too sanguine; on the other, to point out the true share which the extract of meat can have in the nutrition of the people of Europe. In doing this, I know full well that whatever may be said for its recommendation would be in vain, if the extract of meat did not supply a public and generally-felt necessity, and if it could not stand the test of our natural instinct—a judge not to be bribed.—*Lond. Pharm. Journ.*, Dec. 1, 1865, from *The Lancet*.

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#### ALUMINA AS AN INGREDIENT OF SOAPS.

Soaps intended for toilet use ought not to contain any free alkali, seeing that free alkali exercises a corrosive action upon the skin. Soaps, however, which are perfectly neutral, containing no alkali which is not combined with the stearic or other fatty acid employed, are not nearly such powerful detergents as soaps containing an excess of alkali—are not nearly so capable of dissolving the substances which it is the office of soap, when applied to the body, to remove from the skin. Singular to say, M. Bonnamy, a manufacturing chemist resident at Saint-Germain, has found that if that very neutral substance, pure alumina, be added to completely neutral soap, the soap becomes even more powerfully deterative than the most highly alkaline soap, while remaining entirely free from corrosive properties. The alumina may be introduced into the soap in various ways, the most advantageous perhaps being the use, in the process of manufacturing the soap, of an alkaline salt of alumina, as alu-

minate of potash or soda, instead of free alkali. An equally good result is, however, obtained by mixing free alumina, in dry powder, with melted soap which has been manufactured in the ordinary way. M. Bonnamy proposes to use alumina, also, in various cosmetics, and especially in cold cream, and he moreover regards it as affording an admirable base for tooth-powders, by reason of its complete neutrality, and the ease with which it can be tinted by means of perfectly innocent coloring matters.—*Scientific American*.

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#### ANILINE AS A TEST FOR THE ADULTERATION OF LINEN BY COTTON.

A method of using aniline as a means of ascertaining whether or not the linen in any fabric is mixed with cotton, and, if so, in what proportion, is given by Bottger in a recent number of the "Chemisches Central Blatt." At the corners of one end of a strip of the fabric to be tested he loosens the threads so as to expose both the warp and the woof. He then dips that end of the strip in an alcoholic solution of aniline red, washes it in water until the washings are colorless, and then places it in an aqueous solution of ammonia. If any cotton is present, the ammonia will discharge the color from it without touching the color of the linen portion. The linen threads will remain of a bright rose color, but the cotton threads will become quite white.—*Scientific American*.

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### Varieties.

*On the Oxidation of Fatty Vegetable Oils.*—In a memoir presented by M. Cloëz to the French Academy of Sciences, he treats of the influence of light and heat on oxidation. The author's results are of much interest. He exposed oils to the air in colorless glass vessels, and also in vessels of red, yellow, green, and blue glass, and also left some oil exposed to air in total darkness. After ten days exposure, the increase of weight was greatest in the colorless glass vessel; it was rather less in the blue glass: was very small in the red, yellow, and green; and no increase of weight at all was observed in the oil exposed in the dark. Like results were found after twenty days; but after thirty days exposure, the results were



somewhat different. The increase of weight was greater in the colored glasses than in the uncolored, green showing the largest increase, after 150 days exposure. It is worthy of notice that poppy oil, after a time, oxidized faster in the dark than when exposed to colored or white light. Oil, heated in atmospheric air, oxidized much more rapidly than cold oil. The oxidation may be accelerated without heat by adding some oil already oxidized.—*Am. Drug. Circ.*

*A Mountain of Saltpetre.*—Dr. Harrison, the original discoverer of the gold, silver, copper, and lead mines of the Crystal Peak mining district, located near where the Henness Pass road first strikes the Sierra, in coming this way from Virginia City, has recently added to his other discoveries a "mountain of saltpetre." This mountain is said to exist about six miles north-east of Crystal Peak, and it is claimed that there is no mistake as to either the genuineness or quantity of the article. If it occurs in such quantities as described, its location must soon render it of great commercial value.—*Am. Drug. Circ.*, from *San Francisco Mining Press*.

*Bismuth.*—This metal has of late years risen considerably in price. Amongst other causes, some journals have stated that, two or three years ago, a company was formed to work an invention by which gold was to be made by the transmutation of bismuth into that metal, and that large quantities of the former metal had been bought up for this purpose. Whether such an enterprise was or was not entered upon does not appear. The following is a list of the prices:—

	s.	d.		s.	d.
1844 . . . . .	0	10	to	2	0 per pound.
1845 . . . . .	2	0	"	4	0 "
1846 . . . . .	4	0	"	3	3 "
1847 . . . . .	3	3	"	2	6 "
1848 . . . . .	2	6	"	2	0 "
1849 . . . . .	2	0	"	2	6 "
1850-7 . . . . .	2	6	"	—	"
1858 . . . . .	2	6	"	3	6 "
1859 . . . . .	3	6	"	4	6 "
1860 . . . . .	4	6	"	6	6 "
1861 . . . . .	6	6	"	9	6 "
1862 . . . . .	9	6	"	20	0 "
		11 0	"	—	"
1863 . . . . .	11	0	"	10	6 "
1864 . . . . .	10	6	"	11	0 "
1865 . . . . .	10	6	"	11	0 "

Up to 1844, a large quantity of bismuth was produced in this country from cobalt ores in the old way of refining; but a new way of treating

such ores, then introduced, necessitated the loss of much of the bismuth, and, since that time, we have been chiefly supplied from the Saxon and Bohemian mines. In 1845, there was a large demand for a composition to make rollers for calico printers, raising the price for a few months. In 1858, the supply began to fall off, and in 1861-2, there was a very large extra demand for medicinal preparations, which, to a certain extent, still continues, but the demand for mechanical use has, since that time, been very trifling. New sources of supply are opening, and prices, it is said on good authority, are likely to fall.—*Am. Drug. Circ.*, from *Journal of the Society of Arts*.

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*To Keep Eggs.*—M. Bournouf recommends in *Le Belier*, a French journal of commerce, the following method of preserving eggs:—Dissolve in two-thirds of warm olive oil one-third of beeswax, and cover each egg completely with a thin layer of this pomade with the end of the finger. The eggshell, by degrees, absorbs the oil, and each of its pores becomes filled with the wax, which hermetically seals them. M. Bournouf affirms that he has eaten eggs kept two years in this manner, in a place not exposed to too great extremes of temperature. He thinks also the germ may in this manner be preserved for a considerable time.—*Am. Drug. Circ.*

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## Editorial Department.

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**POISONOUS CALOMEL.**—The following item, cut from the Missouri Republican of Nov. 19, 1865, has been sent to us for notice. We are so accustomed to rely upon the purity of calomel as made by Powers & Weightman, and other responsible houses, that it rarely happens that calomel is put to the test. Hence the damage done in the instance above. The manufacturer must have been very careless to have passed such "calomel" into the market for consumption, without subjecting it to the usual test of ammonia added to the washings. The question may be asked how did this calomel pass the Drug Inspector at New York or other point? probably on the faith of the label, which is that of an old House. This occurrence points to the importance of apothecaries themselves looking to the real character of the drugs and chemicals they dispense as the safest and surest means of protecting the community from such catastrophes.

**"Foreign Medicines.**—Not long ago we reported a circumstance occurring in Randolph County, Ill., which resulted in the death of several persons from the administration of English calomel bought in our city. One of our chemists, becoming interested in the matter, obtained samples from all the St. Louis druggists for the purpose of examining them. The English calomel is generally imported in one pound bottles, sealed, and a label pasted over the mouth, so that it cannot be opened without it being noticed. Druggists sell the article as they receive it, and it may pass through many hands before it reaches the practitioner who dispenses

it, and who is the only person able to judge of the contents after leaving the factory in England. If, therefore, any such bottle contains a substance different from what the label calls for, the fault rests with the manufacturer.

The samples received by our chemist were from the well known firms of MANDER, WEAVER & MANDER, of Wolverhampton, and ATKINSON & BIGGAR, of London. It was the label of the former of these which was on the drug dispensed in Chester, as was the case also in a town on the Missouri river where persons were poisoned, but saved by the timely administration of the antidote. The external appearance of the samples was that of good calomel, but in the instance of that sold at Chester and at the Missouri town referred to, the substance was found to be contaminated with corrosive sublimate to the extent of 12.75 per cent. There was no trace of the poison in the other samples, bearing the label of the same firm, but one of three bottles from ATKINSON & BIGGAR contained corrosive sublimate, while no trace of poison could be found in calomel of American manufacture.

If our physicians still persist in using English calomel in preference to American, manufactured by responsible parties whose interest and reputation would be at stake were they to commit such fatal blunders as above related, they ought to be careful to examine every bottle before they use it, for they never can be sure which bottle will contain the dangerous admixture. The easiest method to detect the presence of corrosive sublimate in calomel is the following: Stir a small quantity of the calomel with cold distilled water for a few minutes, filter and add to the filtrate a little of a very dilute solution of iodide of potassium; the presence of corrosive sublimate will be shown immediately by a bright red precipitate; the liquid filtered from pure calomel will not be changed.—*Missouri Republican, St. Louis, Nov. 19, 1865.*

SUNDAY CLOSING IN BOSTON.—Our Boston confreres have arrived at the same conclusion that we have; that necessity knows no law, and when men get sick and need aid they don't stop to inquire what day of the week it is, but send to the apothecary and expect to be served with medicine. An acute cholic or an attack of neuralgia will, for the time, rapidly dispel sectarian prejudices from patients of all sects.

*Massachusetts College of Pharmacy.*—At a special meeting of the Board of Trustees, held Oct. 1st, a committee was chosen to confer with the State Constable in regard to his late order closing the apothecaries' stores on Sunday. The committee attended to their duty, and at the regular meeting of the board, Nov. 1st, made a report of their doings, which was accepted, and ordered to be placed on file; after which the following resolutions were offered and adopted:—

*Resolved,* That we believe the observance of the Sabbath as a day of rest from labor to be a Divine institution, appointed by God for the good of man; that it is alike binding upon us by the laws of God, the laws of man and the good of society; that for these reasons it is both our duty and inclination to observe it strictly, so far as is practicable to the necessities of society as at present organized.

*Resolved,* That by reason of the necessity for dispensing of medicines, and the furnishing of many other articles, to those whose necessities absolutely require them of us on the Sabbath, we have been obliged to conform to the custom of keeping our stores open at all times, as well Sundays as in the night, to be ready to dispense these articles of necessity.

*Resolved*, That by reason of our stores being so opened for the convenience of those whose wants are imperative, a custom has grown up in the community of calling upon the apothecaries for many articles not of prime necessity which could be as well obtained the day before or the day after the Sabbath: that although we do not labor as upon other days, yet the mere selling of those articles has caused a portion of the public to regard us in the light of Sabbath-breakers, classed with barbers, restaurant keepers and bar tenders, that the most conscientious observers of law, order and propriety do not hesitate to call upon us, in violation of the Sabbath and the laws of the Commonwealth, to furnish them with medicinal liquors, stationery, mineral waters, palliative confections, dietetics, cosmetics, and many other articles, all of which, in many cases, are of prime necessity *at the time*, and which would be a violation of the laws of charity and mercy to deny upon the Sabbath.

*Resolved*, That in view of the difficulty of defining what are and what are not articles of charity and necessity, without inquiring too particularly into the motives of others; the mortification we experience in denying our customers and friends what seems to them a reasonable request; the expense of keeping the store provided with the same talent, heat, light and other conveniences as upon other days; the dubious position we hold in the eyes of our best and most conscientious citizens, *until they* wish to be accommodated; the deprivations of the benefits and the blessings of the Sabbath to ourselves and assistants; all render it more to our profit and advantage to close our places of business on the Sabbath.

*Resolved*, That in view of all these facts, we are unable to draw any line for the guidance of apothecaries, and powerless to recommend any articles or class of articles that may or may not be sold legally on the Sabbath. Therefore, we can only recommend to each apothecary to judge for himself of each particular case, and dispense all articles of necessity agreeable to his best judgment, according to the language and intent of the law.

A. P. MEIZAR, *Secretary*.

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INSECTS INJURIOUS TO VEGETATION.—The attention of our readers is called to the following communication, which is extracted from Silliman's Journal for November, and with the spirit of which we entirely coincide:—

*Entomological Society of Philadelphia*.—The publication committee of this Society propose to publish, and issue gratuitously, an occasional bulletin, under the title of "The Practical Entomologist," in which papers on the insects injurious and beneficial to vegetation will be given for the benefit of the American farming interest. They express in their circular (dated September, 1865,) the hope that the information imparted through this medium will be of use to the agriculturists of the country, by leading them to study critically the Entomological fauna which surrounds them, and to derive, from their knowledge thus acquired, the power to increase the production of their crops and develop the interest which they represent. It is a singular fact that some of our commonest and most injurious insects are least known. Our Cotton, Hop, and various other crops suffer at times immensely from insects whose habits we little understand. The Society aims by its publication to bring out the true history of each and all of our noxious insects; and it is believed that, thus attained, simple remedies will suggest themselves, which in certain cases may be merely burning the stubble and vigorous fall ploughing.

They ask, in order that their plan may be carried out, that those having information will send it by letter to the Secretary of the institution, at No. 518 South Thirteenth Street, Philadelphia, along with alcoholic phials containing specimens of the noxious insects of the region. They also de-

sire papers from scientific observers for the "Practical Entomologist," as only the active coöperation of all interested parties will insure success in an undertaking which is a labor of public benefit, without moneyed recompense.

PROGRESS OF AGASSIZ.—It may be interesting to our readers to hear from this intrepid naturalist, which we are able to do by the following extract from the Philadelphia Medical and Surgical Journal for Dec 16 :

Letters have been received from Prof. Agassiz, giving an account of his scientific explorations in and along the river Amazon. Dr. Continto of Brazil, a gentleman of large scientific acquirements, who has already made a thorough exploration of the Amazon, accompanies Prof. Agassiz. He writes as follows, under date of August 22 :

"The Professor does not cease extolling the riches of this region, and is completely absorbed by his darling fishes. We collected in Grupá and Tagipurú ten new species, and likewise a new species of alligator, named Jacaréky. He told me to-day that when the work was concluded, we will make a real revolution in the scientific world. Almost sixty new species in less than fourteen days ! It is really a revolution.

"The great preparations that the Professor made for his collections are far within what nature furnishes him, such is the prodigality of life in the valley of the Amazonas. All is superabundant, and there is a luxuriance of products so extraordinary that it exceeds the most extravagant dreams that the man of science formed when he prepared for his voyage."

Prof. Agassiz himself writes as follows, under date of August 20th :

"The result of our inquiries, above all, respecting fish, goes beyond the most extravagant dreams I ever had. Not only do I know that all the locations we visit nourish different faunas, but I foresee also that the intermediate localities will furnish still new and distinct species, so great are the differences of those we have already studied.

"I had in view to solve the problem of the geographical distribution of the fishes, by making four or five separate collections between Pará and Manáos, but now I know not what limits we should preserve, so that it is best to multiply the collections as far as circumstances will permit."

In another letter of the same date he says :

"It is equally interesting to discover the manner of inter-association of the species ; it is evident, for example, that the fishes assembled at Pará are not the same as those united at Manáos, or in the great affluents of the Amazonas. I have already a certainty of this from the collection I made at Pará. During the eight days spent in your hospitable city, where so many courtesies and such delicate attentions were showered on me, I collected sixty-three species of fishes—of this number nearly a dozen unknown ; and, notwithstanding, about forty-five species are already described as peculiar to the Amazon. Consequently those that are known which I did not discover at Pará must dwell in some other region of the great river. You see now that the work merely of two days tends to demonstrate that each region of this great basin must have collections of different species, a fact that science was completely ignorant of until now.

"Besides, if the species of different regions differ one from the other in the same river, and if marine fishes ascend the river in a limited number to an inconsiderable distance from the sea, shortly it will become improbable that the fluvial species can proceed from the marine species : above all, if the different shoals are found in similar regions of the river and at a short distance from one another.

"Well, you see what results this ought to give in time ; and in the meantime I can only indicate the track that I count on following in my

researches. All I can as yet say to you is, that of the sixty-three species found at Pará not less than forty-nine are inedited, which will require the establishment of eighteen new genera to give them place in the system of fishes. Besides this, I perceive the necessity of distinguishing five families that have been confounded with others to the present time."

Under date of September 8th, Prof. Agassiz writes that he had then obtained more than three hundred species of fish, although he had, to that time, only examined one-third of the Amazon, without trenching on its affluents. He had only counted on, at most, two hundred and fifty or three hundred species, and he says that not a third of those he collected belong to known ones.

The latest report is that Agassiz was to leave Manáos, in Amazonas, on the 10th of September, for Tabatinga, in Peru.

*Pharaoh's Serpents*.—No more remarkable instance of the influence of public curiosity on the production of chemicals can probably be adduced than in the case of the so-called Serpent's Eggs, where sulphocyanide of mercury, an almost unknown salt, is suddenly produced in large quantities to gratify a curiosity, partly real and partly the effect of a name; for, had not an acute suggestion connected the idea of burning this salt in a particular way, so as to give its voluminous ash a serpentine or vermicular form, with the magic art of Pharaoh's wise men, it is not probable that so remarkable a demand would have been made on the chemical caterers.

In another column, page 61, we give Mr. Wood's paper, which gave the first notice to the English and American journals. The sulphocyanide of mercury, like calomel, is insoluble in water, and needs some glutinous excipient to form it into pastilles, but, as this addition detracts from the combustibility of the salt, the art of making them consists in giving them the right degree of firmness without invading this property.

Several accidents have occurred from the ignition of quantities of the salt, and one factory, at least, has been destroyed. We have not yet heard of any destruction of life by the pastilles, but, as they are made from a mercuric salt, it is not impossible that, like white precipitate, sub-sulphate, and other insoluble persalts of mercury, they are poisonous. The products of combustion, however, appear to be harmless—a fortunate circumstance.

*To Our Subscribers*.—An apology is due for the delay in issuing this number, which has arisen from causes partly editorial, but chiefly chargeable to the printer.

*The Internal Revenue Laws in Relation to Pharmacy*.—The special commissioners appointed to investigate the working of the Internal Revenue laws in general, and more especially in relation to alcohol and alcoholic liquors, coffee, tobacco, etc., etc., have been industriously engaged in gathering testimony and other evidence. The committee appointed by the American Pharmaceutical Association at the last meeting, of which Dr. E. R. Squibb is chairman, have obtained a hearing, and have earnestly represented the views of the Association in

reference to the sale of liquors, the stamp tax on proprietary articles, and especially in reference to the reduction of the tax on alcohol, as being greatly conducive to the interests of pharmaceutical and chemical manufacturing; and as probably, by giving less inducement for illicit distillation, and greater consumption in the arts, causing an equal, if not greater, revenue. What the final influence of the commission will effect on Congressional action, we cannot yet know; but we know that, on the main points, considerable harmony of opinion existed between the principal commissioner, and three members of the committee who consulted with him in regard to the more important changes needed.

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*The Richmond Medical Journal.* E. S. Gaillard, M. D., and W. S. McChesney, M. D., Editors and Publishers. January, 1866, Vol. I., No. 1. Richmond, Va., 1866.

The first number of this journal has reached us just as we are going to print. It is announced by the Editors as a monthly octavo of eighty pages; and the Editors have made arrangements which, they think, will give it a standing among first class journals of medical science. We wish it and them success, and cheerfully put it on our exchange list.

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#### OBITUARIES.

JOHN T. PLUMMER M. D., died on the 10th of April, 1865, at Richmond, Indiana, at the age of 58 years, after much suffering from cardiac disease, growing out of frequent severe attacks of acute rheumatism. Dr. Plummer was born in Montgomery County, Maryland, in 1807, though his parents were residents of Baltimore. In 1816 he was placed at Nine-Partner's Boarding School, in New York, where he remained four years. In 1819 his father removed to the west and settled finally in Richmond, Indiana, where the subject of this notice passed the larger portion of his life.

"His boyhood was characterized by great devotion to books, and a remarkable absence of the love of, or indulgence in youthful sports and pastimes," and, according to his own statement, prior to nineteen years, he was avaricious of knowledge and pursued it with intense earnestness. He had a great aptitude for language, and, later in life, acquired a critical knowledge of the English, and studied French, German, Latin, Greek and Hebrew, and was the personal friend and correspondent of Noah Webster.

"Dr. Plummer's scientific acquirements were general and profound," but especially in the direction of natural history and chemistry. He studied medicine with Dr. Thomas Griffith, of Richmond, and graduated in the medical department of Yale College in 1828, at the close of his 21st year, soon after which he commenced practice in Richmond, Indiana, and continued it to the close of his life, a period of 37 years. Of all his studies Chemistry and Pharmacy were his favorites, and the pages of this Journal testify to his ability and thoroughness in chemical pursuits. These essays will be found in the 22d, 24th, 25th, 27th and 28th volumes, whilst his

last communication was in the 31st volume, July, 1859. These essays relate to the acid of the tomato, the fat of capsicum, the action of chromic acid on volatile oils, the coloring principle of red sandal wood, to various pharmaceutical preparations, to the sale of poisons, to the action of ozone on the volatile oils, etc.

Dr. Plummer was a consistent and influential member of the Society of Friends, and in his progress through life was governed by the conscientious convictions of a thinking mind as to his duties, religious, professional and social. He was so strongly opposed to show or ostentation as regarded his acquirements as in this to be almost eccentric, and declined several proffered professorships in medical schools, where he might have given a useful vent to his large accumulations of knowledge in the medical sciences.

PROF. LINDLEY.—The death of Dr. John Lindley, the distinguished Professor of Botany in University College, was announced on the 3d inst. Dr. Lindley was born on the 5th of February, 1799, at Catton, near Norwich, where his father was proprietor of a large nursery garden. After leaving the Grammar School of Norwich, he devoted his attention to botanical science. In 1819, he published a translation of *Richard's Analyse du Fruit*, and in 1820 a work entitled *Monographia Rosarum*, in which he described several new species of roses. About the same period he contributed to the *Transactions of the Linnæan Society* various papers on botanical subjects. Some time afterwards he proceeded to London, where he became Assistant Secretary to the Horticultural Society, and was engaged by Mr. Loudon to write the descriptive portion of his *Encyclopædia of Plants*, the merit of which, as a botanical work, was entirely due to him, as was stated in the preface. The *Encyclopædia* was completed in 1829. In the same year he was appointed Professor of Botany at the London University. At this period the Linnæan system was almost universally followed by English botanists. It is one of the chief merits of Dr. Lindley that he early saw the necessity of superseding the artificial by the natural classification of plants. In an essay on this subject, published in his *Introduction to the Natural System of Botany*, published in 1830, he showed very clearly what the advantages of this system were, and thus paved the way for its general adoption in England. Two years later he published the *Introduction to Systematic and Physiological Botany*, and a *Synopsis of the British Flora*, in which our indigenous plants were arranged and described for the first time according to the natural system. In a *Natural System of Botany*, published in 1836, Dr. Lindley took new views of botanical classification, and proposed a new nomenclature for the families of plants. Ten years later, his great work, *The Vegetable Kingdom*, was published. This work, the most elaborate that had appeared on systematic botany, gave a description of all the families of plants, and more especially of those useful to man. It gave very extended lists of the genera, and was generally recognized as one of the most important contributions which had at that time appeared on systematic botany. While engaged in writing these works, Dr. Lindley was most diligently employed, as a practical botanist, in describing new species, on which he wrote a large number of papers contributed to botanical publications. In 1841, he became editor of the *Gardeners' Chronicle*, a weekly publication, which he conducted with great ability. In 1860, he was appointed examiner in the University of London. He was a Ph. D. of Munich, and a Fellow of the Royal Society, of which, in 1858, he received the medal as a reward for his services to botanical science.—*Chemist and Druggist*.



# Catalogue of the Class of the Philadelphia College of Pharmacy,

FOR THE FORTY-FIFTH SESSION, 1865-66.

*With a List of their Preceptors and Localities.*

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THE  
AMERICAN JOURNAL OF PHARMACY.

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MARCH, 1866.

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ON VERATRUM VIRIDE.

BY CHARLES BULLOCK.

(Continued from page 325 of Vol. 37th.)

NOTE.—Since the publication of my previous article, Prof. Samuel R. Percy, M. D., has kindly furnished me with a copy of his essay on *Veratrum viride*. Finding that I have not given Prof. Percy proper acknowledgments for his elaborate investigations, I would refer to his essay published in the transactions of the American Medical Association for 1864. A full inquiry into the physiological and medicinal properties of the plant will there be found.

The object of the present investigation was to obtain information whether the alkaloid obtained from the plant was *identical* with veratria, and whether the resinoid of Prof. Percy contained any proximate principle to which its great activity could be attributed.

The resin from *Veratrum viride*, obtained by pouring the fluid extract into water, has a dark brown color, and contains so much fatty matter that it dries but imperfectly.

The resin was treated with ether until exhausted, it was then dissolved in alcohol, and the tincture concentrated by evaporation poured into acidulated water, maintaining constant agitation.

The resin, which precipitated in a finely divided condition, was collected on a filter and washed with acidulated water until the washings were no longer disturbed on addition of an alkaline carbonate.

The washings were concentrated, and carbonate of soda added to alkaline reaction. The precipitate obtained was washed, redissolved in dilute acid, partially decolorized by digestion with

purified animal charcoal, and again precipitated and well washed. When dry the precipitate weighed thirteen grains.

*The principle* thus obtained is sparingly soluble in cold alcohol, the alcoholic solution restores the color of reddened litmus paper, it unites with acids affording neutral solutions which are bitter to the taste. The sulphate is freely soluble. With reagents it gives the same reactions as the alkaloid described in my previous paper, and appears to be identical with the principle insoluble in ether therein described.

*Physiological Properties.*—A more extended experience is desirable to attest the effects of this alkaloid. Several trials were made by administering it to persons in health; the result of the experiments are as follows: one-fortieth part of a grain of the alkaloid dissolved in alcohol was administered every quarter of an hour, until one-eighth of a grain was taken; half an hour after taking the last portion the pulse in each case was reduced from eight to twelve beats in the minute. No nausea or other effects were experienced. An impression was produced on the throat resembling that caused by pyrethrum, and the benumbing effects of aconite were wanting.

*The resin* retains the alkaloid with great persistence; when a concentrated tincture of the pure resin is poured into acidulated water, the filtered solution affords a precipitate on addition of ammonia; this precipitate appears to be resin which was held in solution; it does not re-dissolve on addition of acid. When digested with acidulated water the resin does not dissolve, and evidences no basic properties when treated with very dilute acids. So far as opportunity has presented for trying the medicinal effects of the resin, it has been found, in doses of one-third of a grain repeated in half an hour, to produce quite as much sedative effect as the alkaloid.

The character of this resin affords a subject for farther investigation; its insolubility in acid solutions and want of basic properties tend to show that it is not an alkaloid in an amorphous condition.

*As a Summary of this Investigation* we find,

*First.* That *Veratrum viride* contains two alkaloids, one soluble in ether and the other insoluble in that menstruum. Neither of these principles answer in their chemical reactions to *veratria*.

*Second.* That the resinous matter which precipitates when the concentrated tincture of the root is poured into acidulated water carries down with it a notable portion of the alkaloid insoluble in ether.

*Third.* That the alkaloid insoluble in ether, when administered in small doses, has a very perceptible sedative effect on the circulation without producing any other disturbance.

*Fourth.*—That the pure resin produces sedative effects nearly or quite equal to those obtained from the alkaloid.

*February* 19, 1866.

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#### SULPHOCYANIDE OF MERCURY—PHAROAH'S SERPENTS. OLEATE OF SODA AND SOAP BUBBLES.

In the January number of this volume, allusion was made to this salt, and its use as a toy. An esteemed correspondent, whose experience in the manufacture of this salt has rendered him familiar with it, has sent us the following information, which he desires to be anonymous. Take of anhydrous prussiate of potash, (ferrocyanide of potassium,) in fine powder, 184 parts; salt of tartar, (carbonate of potassa,) well dried, 69 parts; sublimed sulphur, clean and dry, 128 parts; finely-powdered charcoal, 6 parts; mix them thoroughly, seeing that there are no lumps of aggregated powder, which object is best accomplished by sifting; and a little extra care in getting the materials thoroughly pulverized and mixed will be amply repaid by the purity of the product.

Place the powder, thus prepared, in an iron vessel, and heat gently, (not quite to redness,) when the edges and bottom of the mass become fused to about the depth of half an inch, stir it thoroughly and rapidly with an iron rod, so as to melt the whole down as soon as possible. When it ceases to flame, and reaches a state of nearly tranquil fusion, which is attained at a heat materially below redness, it is to be cooled; then dissolved in about six or eight times its weight of water, and filtered or strained to separate the insoluble sulphuret of iron. The clear solution may be considered to be a tolerably pure solution of

sulphocyanide of potassium, ( $\text{K.CyS}_2$ ), though there are always small quantities of secondary products formed.

The rationale of the process is probably as follows:—The reaction being between 1 eq. of dry ferrocyanide of potassium, 1 eq. carbonate of potassa, eight equivalents of sulphur, and one of carbon; the potassium and the cyanogen of the ferrocyanide, the potassium of the carbonate, and six equivalents of the sulphur unite to form three equivalents of sulphocyanide of potassium,  $3(\text{K.CyS}_2)$ , the iron of the ferrocyanide and the remaining sulphur form the insoluble sulphuret of iron, whilst the carbon, assuming the oxygen of the liberated potassium, passes off with the carbonic acid as carbonic oxide, and is burnt during the process.

Having now a solution of sulphocyanide of potassium, the next step is the solution of pernitrate of mercury, ( $\text{HgO}^2, 2\text{NO}^5$ ), which is obtained by dissolving mercury in hot nitric acid, and heating until a drop of the solution will not form a precipitate with a solution of chloride of sodium. The solution should then be diluted with water until each ounce of mercury used is represented by a pint and a half of the solution.

The solution of sulphocyanide of potassium is then poured gradually into the mercuric solution as long as a precipitate is formed, *and no longer*, (as the mercurial sulphocyanide is soluble in the solution of nitrate of mercury, when in excess). The precipitate is heavy and subsides rapidly; it is washed in several—three or four—waters by subsidence and decantation, then the creamy sediment transferred to a muslin cloth and squeezed, gently at first, and then more forcibly, and the lump of moist sulphocyanide of mercury, when turned out of the cloth, will be found in just the right condition to be moulded into cones with the fingers. Sometimes mucilage of tragacanth is added, but it is not necessary, as the dried salt ( $\text{HgCyS}_2$ ) has, like the white precipitate of the shops, considerable firmness in mass. The actual play of affinities, during the combustion of the salt, is, perhaps, not certainly known; but the following rationale, involving 24 equivalents of the salt, may be assumed to approach nearly to the truth:—

Before Combustion.	After Combustion.
$24(\text{HgCyS}_2) =$ $\begin{array}{l} \text{Hg}_{24} \\ \text{N}_{24} \\ \text{C}_{48} \\ \text{S}_{48} \end{array}$	$\left\{ \begin{array}{l} \text{Hg}_{12}, \text{ passing off in vapor.} \\ \text{N}_4, \text{ evolved in a free state.} \\ 5(\text{N}_4 \text{ C}_6), \text{ mellon, forming the chief bulk of} \\ \text{the snake.} \\ 18(\text{CS}_2). \text{ The elements of 18 equiv. of bi-} \\ \text{sulphuret of carbon, which, by assuming} \\ 108 \text{ eq. oxygen from the air, become} \\ \text{carbonic and sulphurous acid gases.} \\ 12(\text{HgS}), \text{ cinnabar, which partially remains in} \\ \text{the snake, and is partly consumed and} \\ \text{volatilized on the surface.} \end{array} \right.$

While on the subject of chemical toys, we may as well refer to another. Philosophers, as well as children, may be amused and instructed by blowing bubbles. Several years ago, an account was published of the capacity of a solution of oleate of soda to yield bubbles of extraordinary dimensions and of gorgeous coloring. Our correspondent has taken some pains to investigate this property, and finds that the success of the experiment depends largely upon the purity of the oleate used. The commercial oleic acid made by the manufacturers of stearic acid does not afford an oleate of soda that answers the purpose intended, even though it be purified by combination with oxide of lead, and separation by ether, etc.

The best results were obtained as follows:—Dissolve two ounces of good white Castile soap in 20 fluidounces of boiling water, and add about one ounce of sulphuric acid, diluted with two fluidounces of water, and stir together; the fatty acids of the soap are separated and rise to the surface, where they collect and float as a clear yellowish oily layer. The vessel is now removed from the fire, and, with a syphon, decant the acid solution of sulphate of soda constituting the inferior layer of liquid, carefully avoiding the loss of the oily part by stopping in time. The oily acids are then well washed three successive times in hot water, separating them as before, after which, by exposure to cold, they solidify. The mass is then weighed, put in a suitable dish, and half its weight of finely-powdered litharge added, and the mixture digested at a heat of  $212^\circ$  to  $225^\circ$ , until complete union is effected. The resulting oleo-margarate of

lead, which differs from lead plaster only in containing a smaller proportion of oxide of lead, is to be agitated with at least ten or fifteen times its weight of ether, in a bottle, until it is completely disintegrated. The resulting liquid is transferred to a filter and closely covered; an ethereal solution of acid oleate of lead passes through, and a residue of acid stearate or margarate of lead is left on the filter. To the ethereal solution, add aqueous muriatic acid as long as chloride of lead is precipitated, shake thoroughly, and pour off the resulting ethereal solution of oleic acid, recover the ether by distillation, and the residue in the retort will be nearly pure oleic acid.

To make the oleate of soda, add two fluidrachms of oleic acid to one pint of boiling water, and then solution of pure caustic soda very gradually, until a clear solution is effected, *very carefully avoiding an excess of soda*, and, when cold, add sufficient water to make the solution measure a pint, if necessary. To this standard solution of oleate of soda, add one-half its bulk of glycerin, and the "suds" are ready for use in blowing bubbles. With a funnel about two inches in diameter, our friend has blown bubbles fully sixteen inches in diameter and of remarkable permanency, and so exceedingly beautiful and interesting, that he felt repaid for the time and trouble expended.—ED. AMER. JOUR. PHARM.

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#### PHARMACY IN BUENOS AYRES—"THE REVISTA FARMACEUTICA."

This enterprising representative of South American Pharmacy, in the form of a monthly periodical of 24 octavo pages, is published under the auspices of the Society of Pharmacy of the Argentine Nation at Buenos Ayres.

This journal, originally published as a quarterly, has been issued in its present form for the past year or two, and is under the management of a commission appointed in the Society, who are aided by contributions from other active members of the Society, which now numbers forty-four. In addition to its list of original papers we observe a well selected review of the foreign periodicals, chiefly European.



Several of the communications, we observe, are upon substances indigenous to or peculiar to that rich, but as yet imperfectly developed country, which no doubt contains many products as yet unknown, which may prove of value to mankind. Among others we notice, in looking through some of the former issues, an account of the soap manufactured for domestic use, from that unique production of Buenos Ayres, the grease of horses, and other members of the equine family, with observations upon its chemical composition. This substance appears to be produced in considerable quantity, and has played an important part also as an illuminating agent ;\* we observe also two or three papers upon the cantharides found in that country, and its preparations, one of which, by Dr. H. Burmiester, has been reprinted in this journal, (vol. xxxvii. p. 268), and an essay by Prof. Puiggari upon chemistry applied to hygiene. Several miscellaneous papers of a scientific character also find a place here, among which we may mention, some observations upon these curious Armadillo-like fossils, the various species of Glyptodon, found only in South America, and of which the best collection extant is said to be in the museum of that city, by Dr. Burmiester, Curator of the Museum, with scientific descriptions; also Meteorological Observations, and a note upon a new species of Cetacean found upon the coast of Buenos Ayres, by the same author. An account of the geology of the republic, by Prof. Chas. Murray, with a description of its valuable mines of gold, silver, copper, &c., and its deposits of limestone, gypsum, asphalt, coal, &c.

We learn from its pages that the Society of Pharmacy has been actively engaged in promoting the interests of pharmacy by bringing to the notice of the government the necessity of establishing an authoritative standard, for the purpose of regulating the diversity of action among pharmacutists in regard to the preparation and compounding of medicines; the large foreign population always existing in Buenos Ayres, and the diverse nationalities represented in the medical and pharmaceutical pro-

\*The town of Montevideo was, until lately, lighted by means of this grease, though since the prevalence there of a malignant disease, attributed by the ignorant portion of the community to its use—its employment in that locality has been abandoned.

fessions in that city, having given rise to considerable inconveniences. A carefully prepared volume of 160 pages, compiled by Pedro Banon, one of the members of the Society and Inspector of Pharmacy, in conjunction with Dr. Alburellos, Professor in the College of Medicine, is now only waiting the sanction of the Government to become recognized as the National Pharmacopœia. The Society has also succeeded in obtaining the establishment of two new professorships in the Academy of Medicine in Buenos Ayres, for the especial instruction of pharmacutists; one of which, the chair of Pharmacology, we observe, has been filled, by appointment of the Government, by Carlos Murray, corresponding member of the Philadelphia College of Pharmacy. The Society has also sought to foster the spirit of original investigation among its members, by offering prizes for the best essays containing an examination of substances employed in pharmacy, and by the foundation of a pharmaceutical library.

Not the least valuable portion of the papers appearing in the *Revista*, are those reprinted from the annals of the Society of Pharmacy of Santiago, in Chili; among which we observe several upon the medicinal plants employed among the natives of that country, the properties of which are but little known. We note the following, viz.:

An analysis, by Dr. Angel Vasquez, of the gum of a species of *Cardon*? belonging to the Bromeliaceæ, which, occurring in considerable quantity, has been proposed as a substitute for gum arabic, and is remarkable in containing a large amount of gummy matter, somewhat similar to cerasin, and 53 per cent of pectic acid.

Also, an essay upon the *Euphorbia chilensis*, the juice of which is used as a drastic purgative; also observations upon the *Latua venenosa* of Chili, or tree of the enchanter, by the same author.

The latter is a plant but lately described, and as yet but little known, which produces an effect upon the brain and nervous system similar to that of the *Cannabis Indica*, and, like that, apparently owing its efficacy to a resin. We find also a carefully prepared account of a remedy relied upon, in domestic practice in Chili, for the cure of hydrophobia, by José Vicenti Bustillos, giving a description of its botanical and therapeutical character-

istics, with an analysis, in which two new alkaloids are announced ; and a brief account of a new kind of Rhatany, (*Krameria cistoides*,) from Chili, said to be equal to the commercial article, by Isidro Salinas.

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## ON COLCHICIN.

By MM. LUDWIG AND HUBLER.

In the *Journal de Pharmacie* for December, 1865, is a condensed paper embodying the chief points in the essays of the authors, which were published in *Arch. der Pharm.*, t. cxi., p. 10 and 194. Both chemists employed the seed of colchicum. M. Ludwig confirmed the statements of Oberlin, (see Vol. xxix., p. 235, of this Journal). M. Hubler does not appear to have met with the essay of John E. Carter, published in Vol. xxx., p. 205, of the *American Journal of Pharmacy*, but adopts almost precisely the same method as that writer ; who, however, operated on the corms, and not on the seeds, and obtained a well-marked amorphous alkaloid. M. Hubler treated the seeds (without bruising, which he thinks unnecessary,) with hot alcohol of 90 per cent., added to the tincture [probably after removing the alcohol] twenty times its volume of water to separate fixed oil, filters and precipitates with subacetate of lead to remove coloring matter, and by phosphate of soda to separate the excess of lead, and finally with tannin to precipitate the colchicin. Pure tannin should be used, and its addition should be fractioned, so as to collect the first and last precipitates separately, as less pure than the rest. This precipitate consists of three equivalents of colchicin and two equivalents of tannin, and is very soluble in alcohol and insoluble water. It is pressed and triturated with hydrated oxide of lead, until a little of it, washed with water, affords no coloration with sesqui-salts of iron. The colchicin is separated by boiling alcohol, and, after evaporation, finally dried over sulphuric acid in a vacuum.

Colchicin thus obtained is amorphous, soluble in water and alcohol without residue, has an odor like hay, more evident when in hot water, and is very bitter. It represents the poisonous principle of colchicum. Without action on test papers, its solutions are precipitated yellow by chloride of gold, and white by corrosive sublimate. The mineral acids, as well as the

alkalies, color it yellow. If dropped into strong sulphuric acid and agitated, each particle is surrounded by a green tint passing slowly to yellow; if now a drop of nitric acid is added, it is surrounded by a zone of blue which, by agitation, becomes violet, brown, and, finally, yellow. If now ammonia is added, a beautiful color of onion peel is produced, which is changed to yellow by acids, but restored by alkalies.

At about 284° F., colchicin swells up like a resin, but it fuses without change, except in color, which becomes brown. It burns with a smoky flame and residue of charcoal. Potassa disengages ammonia. Its composition is expressed by the formula  $C_{34}H_{19}NO_{10}$ , which approaches that of Atropia  $C_{34}H_{23}NO_6$ , from which it differs but by  $+H_4-O_4$ .

M. Huber, like M. Oberlin, considers it is wrong to range colchicin among the alkaloids; it is indifferent to the acids, and, if it gives with them a crystallizable compound, the latter contains only the elements of colchicin. M. Oberlin has given the name of *colchicein* to this crystallizable principle, to which M. Hubler gives the per-centage composition of colchicin.

*Colchicin* and *colchicein* are, therefore, isomeric. The latter acting as a weak acid, displacing carbonic acid from carbonates. Alkaline solutions of colchicein cause white precipitates with all the metals which give colorless salts, *green* with ferric salts, *red* with those of cobalt; yellowish green with sulphate of copper. This precipitate is formed gradually, becomes crystalline, and contains colchicin and oxide of copper in equal equivalents. All these compounds are soluble in alcohol.

M. Hubler does not admit the pre-existence of colchicein, but thinks it is produced by the action of acids, and perhaps by bases upon colchicin.

We already know that both colchicin and colchicein are poisonous. M. Hubler believes his researches enable him to conclude that colchicin is only poisonous to carnivorous animals, and that, in a dose in which it would poison these, it appears without action on herbivorous animals.\*

\* This conclusion is in contradiction to the observations of Schroff and others. We should not lose sight of the fact that these experiments have been made with a colchicin very different from that employed by Schroff, which was made by the process of Geiger.

Our readers would do well to consult the paper of Mr. Carter, before referred to, and compare his results with those of M. Hubler. Unless we admit that colchicum contains an active alkaloid in its cormus, and a neutral active principle in its seeds, we cannot reconcile these results, because the processes of Carter and Hubler are so nearly identical that, if the same principle existed in both, it must have been produced in each case. Mr. Carter's alkaloid we have seen, handled, and tested, as to its alkalinity, and reaction with sulphuric acid and nitrate of potassa. As Mr. Carter does not appear to have treated the seeds, nor Mr. Hubler the cormus, it leaves the question open for new investigations which, we hope, will be made, and settle this vexed question—vexed because we have four experimenters, two on each side of the question of alkalinity. Mr. Carter's well-known accuracy leads us to hope that he will resume the subject, and apply his process to the seeds and give the results.—  
ED. AM. JOUR. PHARM.

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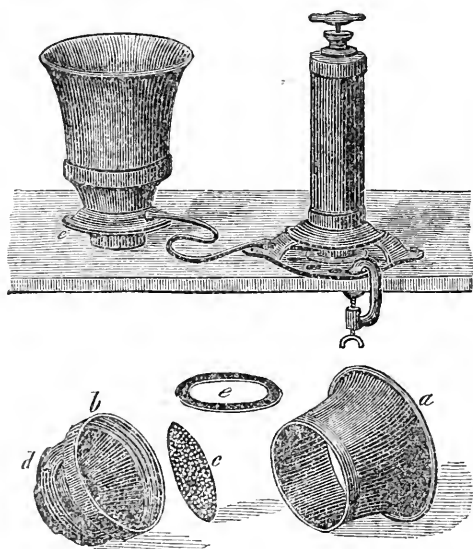
#### ON A NEW INSTRUMENT FOR THE RAPID FILTRATION OF LIQUIDS.

BY EDWARD PARRISH.

This instrument is the invention of A. B. Spencer, of Rochester, N. Y. Its design is to facilitate filtration, on a small scale, by producing a partial vacuum in the receiving vessel, and thus rendering the pressure of the atmosphere available in forcing liquids rapidly through suitable media. It is made entirely of hard rubber, and is neither corroded by acids or alkaline solutions, nor by alcoholic or ethereal liquids. Although neither the principle nor its application is new, the use of this material in such an apparatus constitutes an important improvement, and the ingenious adjustment of the several parts leaves nothing to desire. The air-pump consists of a cylinder, about two inches in diameter and ten inches long, upon a cast-iron base, secured to the table or counter by a clamp; the piston, which works in this with great precision, contains a valve of simple construction. It will be apparent to any one who is familiar with syringes of this material, that it possesses unusual fitness for the purpose; a highly polished surface, with just sufficient elasticity to allow an

elastic piston to move easily and yet tightly through its length, makes an admirable air-pump. The absence of any liability to dent or bruise in handling, or to fracture by any ordinary application of force, is another recommendation.

The air-pump is connected with a funnel by a piece of elastic tube of convenient length. The construction of the funnel is shown in the lower drawing.



The upper section, *a*, has a screw turned upon the outside above its inferior margin; this fits a screw upon the inside of the lower section, shown at *b*; the perforated diaphragm *c*, of hard rubber, is designed to be covered with several layers of filtering paper or cotton cloth, or with chamois leather, or other filtering medium, which is secured tightly in place by the pressure of the upper section *a*, when screwed upon the lower section *b*; at *d* is shown a nipple, on to which the elastic tube is slipped to connect the funnel with the air-pump. A washer, marked *e* in both figures, serves to make an air-tight joint with the receiving bottle into which the funnel is designed to be set; this may conveniently be a quart salt-mouth bottle, if the quantity of liquid does not exceed that measure; but as there is little difference in the width of the mouth of the several common sizes, it may be adapted to almost any of them.

Besides the uses which will suggest themselves to the pharmacist, this instrument is admirably adapted to the purposes of the photographer, whose baths frequently become cloudy, and occasion long delays in the execution of his orders.—*Proc. Am. Pharm. Assoc.*, 1865.

PROPOSED ECONOMY OF ALCOHOL IN PERCOLATION,  
AS APPLIED TO THE EXTRACTS AND FLUID EXTRACTS  
OF THE PHARMACOPŒIA.

By EDWARD R. SQUIBB, M. D.

The increase in the price of alcohol since the last revision of the U. S. Pharmacopœia, has materially interfered with the use of the officinal extracts and fluid extracts, by the greatly increased cost of preparing them, and unless some plan can be found whereby either the cost or the quantity of alcohol may be reduced, it appears probable that these classes of convenient and useful preparations will be disused or debased.

The class of fluid extracts just coming into popular use has already suffered much, both in the way of disuse and debasement, and so little uniformity is there in the character and effects of these preparations, as put forth by different manufacturers, that it is far more difficult than ever before to base any conclusions upon their therapeutic application.

In the case of the solid alcoholic extracts, the cost of the alcohol is often four or five times that of the drug extracted, and not unfrequently amounts to two-thirds of the whole cost of the finished preparation. The present range in the price of alcohol places it at about ten times its former cost, with the certainty of a farther rise to at least twelve times. Under circumstances somewhat similar, the Government of Great Britain has been for some years past engaged in well directed efforts to reduce the price of alcohol for certain uses in the arts, but thus far these efforts have not been of much avail to pharmacy.

It therefore appears more practically useful to seek for an economy in the quantity to be used in effecting the purposes of the Pharmacopœia; and in this direction the present writer determined to make some efforts in the preparation of the following paper. This undertaking was commenced more than a year

ago, and has occupied much time and attention, in the hope that results might be attained such as might induce the Committee of Revision of the Pharmacopœia to meet and modify the formulas which the increased cost of alcohol has so seriously affected. These results, now to be given, have convinced the writer, as an individual member of the Committee of Revision, that a meeting should be called, and the matter seriously considered in regard to this or some better method of remedying an evil which could not have been foreseen.

The general plan of the Pharmacopœia for the preparation of its extracts and fluid extracts, is to exhaust the drug perfectly with an alcoholic menstruum by percolation, and then to drive off the menstruum, in whole or in part, by evaporation.

The plan here suggested, as being under present circumstances an improvement upon this, is to exhaust the drug imperfectly by the menstruum, or only to that point at which the menstruum is of more value than the resulting extract obtained by its use, thus sacrificing the cheaper drug rather than the dearer alcohol. For example, in making the alcoholic extract of belladonna, about 75 per cent. of the total extract is obtained by the use of one-third of the menstruum directed. It follows then, that two-thirds of the total menstruum is required to obtain the last fourth part of the total extract, and it is proposed to save this two-thirds of the menstruum whenever its value greatly exceeds the value of the product to be obtained by its use, and throw away the drug instead. Belladonna leaves of good quality yield about one troyounce of solid alcoholic extract from eight troyounces, by the use of about thirty fluidounces of alcohol. If well managed, three-fourths of this extract is contained in the first eight fluidounces of percolate, and this may easily be obtained by the use of ten fluidounces of alcohol, water being used to push it through. Now, taking the value of the troyounce of finished extract at \$1.25 and the thirty fluidounces of alcohol at 3.5 cents per fluidounce, or \$1.05, three-fourths, or ninety-four cents worth of the extract is obtained by the use of one-third or thirty-five cents worth of the alcohol, whilst the last fourth or thirty-one cents worth of the extract requires twice as much, or seventy cents worth of the



alcohol. Thus, by stopping the percolation at the point indicated, thirty-one cents worth of product is lost, but seventy cents worth of alcohol is saved, and this reduces the value or cost of the diminished product obtained, by thirty-nine cents. The value of three-fourths of a troyounce would then be fifty-five cents, (or  $73\frac{1}{2}$  cents per troyounce,) making an economy in value of 58 per cent. due to saving in alcohol over and above the value of the extract lost. This, too, is based upon the assumption that the therapeutic value of the extract is the same from first to last,—an assumption quite contrary to facts obtained in the case of colchicum seed, to be hereafter given.

In the case of the fluid extracts, the problem is by no means so easy of demonstration, and it is to the difficulties attending the application of the same plan to this important class of preparations that this paper is mainly devoted. The alcohol used as directed in the official formulas, even when carefully recovered as far as possible by distillation, rarely amounts to less than one-fifth of the total cost of the finished preparation. It often amounts to one-third, and occasionally to one-half or more, and this in operations upon a large scale. In the hands of the dispensing pharmacist the cost is far greater.

The difficulties in applying the proposed plan to this class arise mainly from the necessity that the finished preparation shall bear to the drug from which it is made, the definite relation of a minim for each grain in effective therapeutic value.

A series of preliminary experiments, which it is not necessary to detail, proved very conclusively, first, that in exhaustion by percolation there is a sufficient degree of uniformity of results to admit of the adoption of a model plan of proceeding applicable to drugs in general; second, that the extract or soluble matter yielded to the menstruum is not uniform in its chemical and therapeutic value as obtained during the different stages of the percolation, but diminishes in effective value far more rapidly than the extract does in weight; and, third, that this decrease in value depends upon the difference in solubility between the active and inactive portions of the extract, and that the ratio of this decrease is about the same for drugs in general, provided the proper menstruum be used.

Hence, it became necessary to adopt some one of the official preparations as a model, and study it out thoroughly, not only in its pharmaceutical relations, but also in the therapeutic relations involved in its pharmacy. And then, in the light obtained from such a model, to examine other drugs individually, to ascertain their points of difference or similarity.

In selecting a drug to serve as a model, colchicum seed was adopted, first, because it is an active definite purgative, and its therapeutic value thus easily determined by taking it; second, because its extract can be easily and perfectly dried upon a water bath for weighing, and can afterward be perfectly and entirely redissolved; and, third, because it presented a fair average facility of management in percolation, and represented a large and important number of preparations.

*Fluid extract of Colchicum Seed.*

The exact quantities of the Pharmacopœia were adopted and nineteen separate percolations with these quantities were made. At first English colchicum seed of good quality, powdered by the writer, was used, but fearing this might not represent the drug most frequently used, it was abandoned, and good German seed purchased in powder, as ordinary pharmacutists would do, was substituted. This change exhibited a very marked difference between these two commercial varieties of the seed, in the proportion of dry extract yielded by different parts of the percolate, this difference amounting to full six per cent. in the earlier portions of the percolate, in favor of the English seed. Whether this difference extended to the therapeutic effect was not tried.

A critically accurate experiment with the official formula was then made and examined as a standard for comparison. The pint of finished fluid extract, strictly official, was found to contain 1452 grains of solid dry extract, or 89·5 grains to the fluidounce. Of the 1452 grains of extract 1008 or 69·38 per cent. was contained in the reserved percolate, or the twelve fluidounces which first passed through; and 444 grains, or 30·62 per cent. in the final percolate, or the four fluidounces to which

the last two pints of the percolate was reduced by evaporation. The results of this experiment occupy the second division of the table given farther on, under the head "Strictly Official." The third division of the table gives the results of an experiment with the official formula, but purposely made with less care and skill, and is intended to be such a result as would be obtained by a rather careless, inexperienced, or unskilful operator, and it is supposed that it fairly represents the worst results that could be honestly obtained from any application of the official process. The pint of finished fluid extract in this case contained 1417 grains of dry solid extract, or 88.56 grains to the fluidounce. Of this, 945.67 grains, or 66.74 per cent. was contained in the reserved percolate, and 471.33 grains, or 33.26 per cent. in the final percolate, so that it seems hardly possible to get less than two-thirds of the total extract in the first twelve fluidounces of the percolate, or more than one-third in the remainder or final percolate, whilst the first twelve fluidounces is easily obtained by the use of fifteen fluidounces of menstruum, no matter how carelessly applied. One-half of each of these two portions were mixed together to make the official fluid extract as directed, and the other half of each kept separated for the trials of efficiency. It was next sought to determine the absolute and relative therapeutic values of the products of this formula, which, from its being carelessly or unskilfully conducted, would give results well guarded against being overstated. These trials of absolute purgative effect when taken, were made upon the writer's own person when in excellent health and upon a well regulated regimen, and sufficient intervals were always allowed between the purgative doses to enable the alimentary canal to resume its natural tone and condition. The doses for each trial were two. One taken at 6.30 P. M., half an hour before the evening meal, and the other at 10 P. M., or three and a half hours after the first, both in a measured quantity of water. When the doses produced no sensible effect throughout the night and day following, forty-eight hours was considered to be a sufficient additional interval before repeating the trial. But when a decided effect was obtained, a week and often two weeks were allowed to elapse be-

fore resuming the trials. When there was any reasonable room for doubt the trials were repeated, and therefore the results given are believed to be reliable.

It was first ascertained by repeated trial, that, of the identical powdered seed of which the fluid extract was made, not less than eight grains at the first dose and ten grains at the second would produce, on the following morning, a distinct decided purgative effect, and this attended with slight nausea and discomfort, which continued throughout the entire day. This, therefore, was adopted as the standard quantity for comparison. Now, the official formula for this and other fluid extracts is based upon their representing the drugs from which they are made, in the convenient and definite proportion of a minim for each grain, and this, from the very effective and perfect exhaustion ordered, is doubtless strictly true in a pharmaceutical sense; but whether this is equally true in a therapeutic sense remains to be tried. To determine this, precisely the same number of minims, accurately measured in a narrow pipette, of the finished fluid extract, as of grains of the powdered seed, were taken at the same time of day and under practically the same conditions of regimen, exercise, etc. The purgative effect on the following morning was distinctly and decidedly greater than from the powdered seed, but the nausea was the same, or possibly a little less. The fluid extract, therefore, over represents the drug from which it was made, and this may be reasonably accounted for upon two good grounds. First, the powdered seed is doubtless more perfectly extracted in the percolator than it can be in the stomach; and, second, because the fluid extract is presented to the living surfaces in a liquid form, much better adapted to both prompt and energetic action. This is theorizing, it is true, but the reasoning is after the fact, and cannot change its force.

It next remained to be tried whether the 33 per cent. of the total extract contained in the 25 per cent. of the total fluid extract, constituting the final percolate, was equal in purgative effect to the same quantity of extract contained in the finished fluid extract. That is, the finished fluidextract contained 88.56 grains of dry extract to the fluidounce; the reserved percolate only 78.806 grains; but the final percolate contained 112.83

grains to the fluidounce. Now, if the proportion of dry extract was a measure of the medicinal effect of the liquid which contained it, and was equal in medicinal effect as obtained from all parts of the percolate, then the final percolate, from its larger proportion of dry extract, should be 27 per cent. more effective as a purgative than the finished fluid extract, (as  $88.56 : 112.83 :: 100 : 127.4$ .) That is to say,  $6\frac{1}{2}$  and 8 minims of the final percolate should produce a similar effect to 8 and 10 minims of the finished fluid extract, because the two portions of liquid contain practically the same weight of dry extract; and this was the starting point for the trials, but the doses were without sensible effect. They were then rapidly increased until a little more than double the standard dose of the finished fluid extract was reached. This double dose produced a purgative effect on the following day, which was, perhaps, slightly greater than that of the standard dose of the powdered seed, but not greater than that produced by half the quantity of the finished fluidextract. That is to say, it required twice and a half the quantity of the dry extract contained in the final percolate to obtain the effect of that contained in the standard dose of the finished fluid extract. This proves conclusively that the extract obtained in percolating this drug diminishes very rapidly in medicinal or therapeutic value as the percolation advances,—far more rapidly than the quantity or weight of extract obtained does; and also that, while the reserved percolate contains but 67 per cent. of the total dry extract, this 67 per cent. represents a much larger proportion of the total medicinal or therapeutic value of the powdered seed used.

The final percolate, used as above mentioned, was prepared as follows: The whole of the "two pints more of tincture," directed in the official formula to be obtained after the reserved percolate, was duly evaporated to the four fluidounces as directed; but it was found that a portion of the extract was precipitated during the evaporation. The evaporation was therefore continued at a low temperature on a water bath until the measure was reduced to about two fluidounces, when alcohol was added to bring it again to the prescribed measure of four fluidounces. By this management the precipitated portion and the oil were

all redissolved perfectly, and gave a clear solution, well representing the entire two pints of percolate last obtained. This management of the precipitate, which usually occurs in the evaporation of the final percolate of all drugs, has been often adopted in the preparation of fluid extracts upon the large scale, and is considered to be an improvement upon the more literal reading of the formulas of the Pharmacopœia, since it avoids the precipitation which occurs not unfrequently from the reserved percolate itself upon dilution with the one-third of its volume of a more watery solution.

The results above stated point directly to the conclusion that the sixteen troyounces of the powdered seed can be safely and certainly percolated to fourteen fluidounces, so that this fourteen fluidounces cannot represent less than fourteen troyounces of the drug, or minim for grain in medicinal value, and this with an unskilful manipulation and a good allowance against overstatement beside.

It was next proved by experiment, that in order to obtain this fourteen fluidounces of percolate, not more than twenty fluidounces of menstruum could ever be required, even by unskilful management, whilst with good management eighteen fluidounces is sufficient, the last portions being pushed through with water. Assuming the twenty fluidounces as the quantity necessary, of the three pints of menstruum to be used in accordance with the officinal directions, one pint and twelve fluidounces, or 58·3 per cent. is saved. Two-thirds of this saving being alcohol, at 3·5 cents per fluidounce, it amounts to 55 cents upon the fourteen fluidounces, considerably more than the two fluidounces of fluid extract would be worth, beside the saving in evaporating and in the skill and complexity involved in the officinal process, whilst the product of this simple and easy process is transparent, lighter in color, and likely to be so permanently.

The prominent necessity for economizing alcohol now, beyond what was recognized at the last revision of the Pharmacopœia, points toward the closest possible scrutiny of the officinal processes, to ascertain if these, as directed, are the best adapted to the rapid and early exhaustion of the drugs by percolation ;

and this directed the attention of the writer, during these experiments, to some points which appeared worthy of a critical review in this new relation to the increased cost of alcohol. First, it was found that the quantity of menstruum used to moisten the powder before packing, was a matter of much importance. Thus, powdered colchicum seed, in the officinal quantity, moistened with four, six, eight, or ten fluidounces of menstruum, and packed as well as possible, one after the other, in the same percolator, gave reserved percolates containing 984, 1024, 947, and 786 grains of solid dry extract, thus showing conclusively that the officinal proportion, namely, six fluidounces, is the best adapted to the rapid or early exhaustion of this drug. The packing is much better and the percolation slower when eight or ten fluidounces are used, but the point of practical exhaustion is attained later, and the difference is more marked the earlier the observation is made in the progress of the percolation. When eight fluidounces of percolate has passed, the difference is very great. When twelve fluidounces has passed, the difference is as above given. When a pint has passed, the difference is smaller, but still notable. After this, the difference becomes so small as to be quite unimportant; and when carried to the extent of the officinal directions, the exhaustion is practically the same in all.

The form of percolator best adapted to this drug was next examined. Six experiments with each form, conical and cylindrical, all resulted very decidedly in favor of the cylindrical form by a difference of 50 to 59 grains of dry extract in the reserved percolate. If the percolation be carried out to anything like the extent directed by the Pharmacopœia, however, the results are practically the same whichever form be used. But should the formula ever be modified upon the basis of the plan here proposed, the form of percolator to be used should be changed to the cylindrical.

It was found in practice with this drug, as with percolation in general, that much alcohol may be saved by the skilful and judicious use of water to push the last part of the percolate through. The constant quantity of liquid held by sixteen troy-ounces of powdered colchicum seed is from sixteen to seventeen

fluidounces; and if this fluid be alcoholic, ten or twelve fluidounces of it may be easily pushed out of it by displacement with water without the smallest risk of admixture of the percolate with the water. In using the officinal quantity of seed, therefore, it is only necessary to have the menstruum four to six fluidounces in excess of the required percolate when water is used. One precaution, however, is necessary to the best attainable results, namely, that the water be poured on top just as the last of the spirit disappears from the surface. Attention to this point will always save two to three fluidounces of the menstruum, as a small excess will then form a partition, which follows the percolate down, and effectually protects it from admixture with the water. Should the percolation be arrested by the impaction of the surface, which sometimes follows the application of water, as in *ipecacuanha*, it is only necessary to scrape off the impacted or impervious surface, and renew the water from time to time.

In the table upon the opposite page are given the results of some of the percolations of *colchicum* seed made for this paper.

In the first division, the first column indicates the portion of the percolate represented by the figures upon the same line in the next column; these two columns recording an experiment wherein every fluidounce of percolate to the twenty-fifth was tested by evaporation. The table then commences again with a column indicating the portion of percolate represented by a weight of solid extract upon the same line with it throughout the remainder of the table. The "Total" is the sum obtained by the addition of all the portions of dry extract. The "Reserved Percolate" is a repetition of the line above, marked "1st 12 f̄s." The "Final Percolate" is the whole extract yielded after the reserved percolate; and the "Finished Fluid Extract" is the yield of the finished extract after filtration. It should therefore always fall short of the sum of the weights of extract by addition, but in two instances does not do so. The percolation was in several instances carried beyond the point indicated in the *Pharmacopœia*, to exhibit the rate of exhaustion. This extract consists largely of oil, and, from some crude trials, is probably quite inert. The average may therefore, probably, be safely taken as the weight of the constant quantity of inert matter; and if



TABLE I.  
*Percolation of Powdered Colchicum Seed.*

Portion of percolate represented in next column.	Dry extract yielded.	Portion of percolate represented in the following columns.	PARALLEL EXPERIMENTS.				PARALLEL EXPERIMENTS.				Probable effective extract.
			Conical Percolator.*		Cylindrical Percolator.		Conical Percolator †		Cylindrical Percolator.		
			Dry extract Yielded.	Per centage of total extract.	Dry extract Yielded.	Per centage of total extract.	Dry extract Yielded.	Per centage of total extract.	Dry extract Yielded.	Per centage of total extract.	
fl. oz.	grains.		grains.		grains.		grains.		grains.		
1....	108.21	1st 4 fluid oz	424.56	29.215	423.57	29.101	.....	.....	.....	.....	.....
2....	102.16	2d 4 "	345.23	23.760	375.60	25.80.	.....	.....	.....	.....	.....
3....	98.02	1st 8 "	769.73	52.975	799.17	54.90	734.18	51.811	780.84	53.722	732.34
4....	93.85	3d 4 "	238.36	16.404	268.08	18.411	211.51	14.926	246.37	16.951	232.12
5....	88.96	1st 12 "	1008.09	69.379	1067.25	73.317	945.67	66.737	1027.21	70.673	954.46
6....	84.90	4th 4 "	141.31	9.71.5	139.03	9.559	132.98	9.385	171.8	11.825	147.62
7....	78.34	5th 4 "	89.08	6.131	68.34	4.700	101.12	7.136	71.12	4.893	46.87
8....	71.44	6th 4 "	58.53	4.025	38.52	2.647	70.93	5.006	49.93	2.816	16.68
9....	64.68	7th 4 "	41.49	2.855	32.84	2.254	43.90	3.093	32.60	2.243	8.35
10....	57.55	8th 4 "	24.82	2.052	29.26	2.010	39.26	2.7.71	28.34	1.950	4.09
11....	50.42	9th 4 "	30.00	2.0.5	27.97	1.92.	30.56	2.156	26.85	1.848	2.60
12....	45.19	10th 4 "	27.97	1.925	27.23	1.871	27.60	1.948	28.15	1.947	3.90
13....	39.36	11th 4 "	26.32	1.812	25.60	1.718	25.01	1.764	26.30	1.810	2.05
14....	35.98	Total.	1452.61	.....	1455.50	.....	1417.03	.....	1453.37	.....	1186.62
15....	31.99	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16....	28.15	Reserved percolate.	.....	.....	.....	.....	.....	.....	.....	.....	.....
17....	25.19	Final percolate.	1008.09	.....	1067.25	.....	945.67	.....	1027.21	.....	954.46
18....	22.09	Finished Fluid Extract.	444.52	.....	388.25	.....	471.35	.....	426.16	.....	232.16
19....	17.46	.....	1432.03	.....	1466.20	.....	1432.03	.....	1426.10	.....	.....
20....	15.74	In each fluid oz of Fluid Ext.	89.50	.....	91.64	.....	89.50	.....	89.13	.....	74.13
21....	13.38	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
22....	11.99	12th 4 fluid oz.	24.45	.....	24.26	.....	.....	.....	25.74	.....	.....
23....	10.28	13th 4 "	.....	.....	22.60	.....	.....	.....	24.18	.....	.....
24....	8.19	14th 4 "	.....	.....	.....	.....	.....	.....	20.37	.....	.....
25....	8.38	15th 4 "	.....	.....	.....	.....	.....	.....	22.23	.....	.....

this constant quantity be subtracted from every weight of the whole series, the remainders will much more nearly represent the medicinal or therapeutic value of the extract. The result of this subtraction, applied to the last experiment of the last parallel, is shown in the final column of the table, as being the probable quantity of extract of average medicinal efficacy yielded from each portion of the percolate represented by it. This final column is headed "Probable effective extract," and 24.25 grains is adopted as the constant quantity, this being below the mean of three evaporations of the 12th four fluidounces of percolate. This calculation makes the reserved percolate represent 80.48 per cent. of the total medicinal value of the sixteen troyounces

\* This experiment is strictly official, and is adopted as the standard. See page 112.

† This experiment is official, but less critically so. See page 113.

of the drug, and thus is in practical accord with the therapeutic trials.

The third division of the table, consisting of two pairs of columns, shows in the first pair the weight of dry extract contained in each successive portion of the percolate in another experiment, and the per centage value this weight bears to the whole of the dry extract contained in a pint of the finished fluid extract. This experiment was made with a conical percolator, and is critically official; and the next pair of columns is a precisely similar and parallel experiment, except that it was made with a cylindrical percolator, to exhibit the differences arising from the form of percolator.

The third portion, of two columns, is the record of the official experiments carelessly and unskilfully made with a conical percolator, the results of which were used in the therapeutic trials of the purgative effect. That is, one-half of the product of percolation was used to determine the dry extract, and the other half for the trials of medicinal effect. The fourth pair of columns of the table is an experiment parallel with the third pair, except that a cylindrical percolator was used, to exhibit the difference in result.

The percolators used in these experiments are so well adapted in size and form to the management of the official quantities that their dimensions may perhaps be usefully given. They are made of stout tin plate well and smoothly soldered. The conical one is 9 inches across the top, and the same in the length of the side down to the outlet, which outlet is  $\frac{3}{8}$  inch in diameter. From this outlet projects downward a conical tube two inches long, diminishing in size to  $\frac{1}{4}$  inch or less at the extremity. The cylindrical percolator is  $3\frac{5}{8}$  inches across the top,  $2\frac{7}{8}$  inches across the bottom, and 11 inches long. The bottom is shallow cup-shaped, with a conical tube in the centre an inch long, with a  $\frac{1}{4}$  inch opening at the extremity. Both are fitted with close covers, and are used suspended by wire bails or handles attached to opposite ears on the upper rim. When used suspended, they are more easily kept vertical, and the percolation is therefore more uniform. It is beside more convenient and safe than when set upon a bottle.

In concluding the experiments with fluid extract of colchicum seed, it was determined to see how far facts would corroborate the general statement made in the early part of this paper, perhaps somewhat loosely as a matter of judgment or opinion rather than as an established fact, namely, that the high price of alcohol had tended to debasement as well as to disuse of this convenient class of preparations.

Two bottles of the commercial fluid extract of colchicum seed, purporting to contain one-quarter of a pound each, were purchased from an undoubted source. These were of different manufacture, and the two makers of these fluid extracts together, perhaps, supply four-fifths of the entire demand of the United States for these preparations. The labels of these bottles bear the officinal name in English. One has the sentence, "Dose, 5 to 15 drops;" the other, "Dose, five to twenty drops, gradually increased." The first of these was much lighter in color than the officinal, more fluid, and had a whisky odor, as though made from whisky instead of alcohol. It yielded 15.28 grains of dry extract to the fluidounce, or about one-sixth of the proportion (89.5 grains) yielded by the officinal preparation. This preparation was swallowed in doses gradually increased up to two and a half times the standard dose of the officinal preparation, under precisely similar conditions, without producing any sensible effect whatever, and was then abandoned for want of time to try it farther. It can therefore be at best but little over one-third the medicinal strength of the officinal preparation. This fluid extract was sold to the writer at 90 cents for the quarter of a pound and bottle.

The second bottle is about the color of the officinal, but much more transparent. It contained a small proportion of sediment of a light color, and had a slight odor of caramel, with but little odor of spirit or alcohol. It yielded 114.92 grains of dry extract to the fluidounce, or nearly one-third more than the officinal preparation, and this, in drying on the water bath, became very mucilaginous and tough, as though it mainly consisted of gum, and was wholly unlike the extract from the officinal preparation. For want of time, this preparation could not be tried thera-

peutically like the others were, by commencing with the standard dose and then increasing, so as to be able to state definitely the quantity that produced no sensible effect. But instead of this, one single dose of  $17\frac{1}{2}$  minims at 6.30 P. M. and 24 minims at 10 P. M. was taken, this being nearly  $2\frac{1}{3}$  times the standard dose. This produced a distinct and decidedly greater purgative effect than the standard dose, and a far longer and more distressing nausea. Indeed, the nausea continued for 36 hours, long after the purgative effect had ceased. As a matter of fair judgment or opinion, it may be stated that perhaps less than double the quantity of this preparation would have produced the same effect as the standard dose; and, to be quite secure against overstatement, one and a half times the quantity of the official may be set down as its therapeutic equivalent.

This preparation also cost 90 cents for the quarter pound and bottle, or \$3.60 per pound, including bottle. The first gives evidence of plenty of badly rectified spirit or whiskey in its preparation, and but little colchicum seed. The second gives evidence of little spirit,—just enough to preserve it,—and a deficiency also of colchicum seed, extracted with a menstruum so watery that the mucilaginous part of the seeds was extracted and held in solution in undue quantity. These preparations are both at least 50 per cent. deficient in strength; and one certainly more than 110 per cent. deficient, as judged of by therapeutic comparison with a carelessly made official fluid extract. And yet, upon these preparations, differing between themselves at least 60 per cent. in medicinal value, the general character of colchicum seed as a medicinal agent depends. Any comments upon this condition of the materia medica seems quite unnecessary.

#### *Percolation of Powdered Calisaya Bark.*

The next drug taken up for examination was Calisaya bark. Two lots of calisaya bark of five ceroons each are represented in the examination. These were bought at different times, and the lots powdered separately. Both were undoubtedly true calisaya bark,—the official *Cinchona Flava*,—and yet presented as great differences in the manipulation as are ever met with in

different parcels of the same article. The first five ceroons, called here, for convenience in designating the two, the "Old Bark," was coarsely powdered; that is, was in the condition officinally defined as "moderately fine powder." The second lot, or "New Bark," was powdered very finely, or as it is commonly sold as powdered bark.

The officinal quantity of sixteen troyounces, or 7680 grains, was taken for each percolation.

Both were percolated in cylindrical percolators with the officinal diluted alcohol, but moistened with different proportions of the menstruum, for the purpose of arriving at the best proportion.

The percolates from the old bark deposited, on standing, much more cincho-tannates and cinchonic red than the new; and the latter made a perfectly transparent fluid extract either with the use of glycerine or sugar; whilst the former would do so with neither of these under any management that could be adopted with the percolates after they had passed. In four instances, the percolation was carried beyond the officinal quantity, and always with the same result, of obtaining a proportion of solid extract, which diminished very slowly; so that the point of absolute exhaustion was never attained. And the percolates to the very last gave precipitates with solution of iodo-hydrargyrate of potassium. It may therefore be stated that here, as in the case of colchicum seed, no reasonable continuation of the process of percolation will absolutely exhaust the substance of soluble matters or of the alkaloids; but that a point is reached, and that always far short of that indicated in the officinal formula, where practical exhaustion is easily and economically attained. It is quite certain, that in this and in all drugs, a large percentage of the extract yielded is medicinally inert and useless; and it is extremely probable, if not proven, that when the menstruum is well selected and well adjusted to the greatest solubility of the medicinally active portion of the extract, that that portion is more easily and more rapidly washed out in percolation; and hence, that the quantity of the active principles in each successive portion of the percolate diminishes in a more rapid ratio than that of the whole extract. For example, cali-

saya bark may contain on an average four per cent. of its weight of alkaloids in their natural combinations, and this small proportion of the whole is alone medicinally effective, so that all the remainder should be excluded from medicinal use, if that was practicable. But calisaya bark, by the officinal process of percolation, yields twenty-two per cent. of its weight of dry extract. It follows, then, that at least four-fifths, or eighty per cent., of this dry extract is inert and useless, and need not be extracted if the remaining fifth, or twenty per cent., could be extracted without it.

Now, if we admit, in order to secure perfectly safe conclusions, that in the percolation the exhaustion of the active medicinal portion of the extract is not more easy or more rapid than that of the inert portion, but that it diminishes in the same ratio, then it is only necessary to subtract eighty per cent. from the weight of extract yielded from each successive portion of percolate to obtain a safe and useful index of the true medicinal value of every stage of the process of percolation. And this once obtained, shows, with something like mathematical accuracy, where the percolation may be stopped to obtain the best and most economical practical results.

The following table (Table II.) presents the results of three experiments with the old bark and one with the new. The first three vary only in the proportion of menstruum used to moisten the powder before packing. The middle proportion, viz., ten fluidounces, is the officinal one; but the last proportion, namely, eight fluidounces, was found to give the best results, and was therefore adopted in the fourth experiment with the new bark. This experiment with the new bark was repeated three times, and of these, the lowest or least favorable one was chosen for the table. The first column of the table indicates the portion of the percolate represented by the quantity of dry solid extract upon the same line in all the succeeding columns. Then, each of the four experiments has a group of three columns. The first of these three gives the number of grains of dry solid extract contained in the measure of percolate opposite to which it is found. The second column of the group gives the percentage amount of this dry solid extract as calculated from the total extract yielded

by the whole four pints of percolate. And the third column of each group gives the percentage amount of actual medicinal value as obtained by subtracting the eighty per cent. of inert extract from the yield of each successive portion of the perco-

TABLE II.  
*Percolations of Powdered Calisaya Bark.*

PORTION OF THE PERCOLATE REPRESENTED.	EXPERIMENT I. Old Bark. Moistened with 6 fluidounces of menstruum.			EXPERIMENT II. Old Bark. Moistened with 10 fluidounces of menstruum (Official.)			EXPERIMENT III. Old Bark. Moistened with 8 fluidounces of menstruum.			EXPERIMENT IV. New Bark. Moistened with 8 fluidounces of menstruum.		
	Number of grains of dry solid extract yielded.	Per centage of the total extract.	Per centage of actual medicinal value.	Number of grains of dry solid extract yielded.	Per centage of the total extract.	Per centage of actual medicinal value.	Number of grains of dry solid extract yielded.	Per centage of the total extract.	Per centage of actual medicinal value.	Number of grains of dry solid extract yielded.	Per centage of the total extract.	Per centage of actual medicinal value.
1st 4 f 3	545.35	31.051	6.210	527.10	30.310	6.062	564.70	32.604	6.521	380.05	23.605	4.601
2d 4 f 3	411.35	23.425	4.685	394.84	22.706	4.541	380.04	21.942	4.388	282.81	15.899	3.182
3d 8 f 3	956.60	54.476	10.895	921.96	53.019	10.604	1411.74	54.546	10.995	642.84	38.914	7.783
4th 4 f 3	276.15	15.726	3.145	342.26	19.681	3.939	379.38	21.327	4.265	214.66	13.000	2.600
1st 12 f 3	1232.75	70.202	14.041	1264.22	72.700	14.540	1321.12	75.733	15.174	857.52	51.914	10.383
4th 4 f 3	202.47	11.530	2.306	192.06	11.044	2.209	188.91	10.907	2.181	192.43	11.648	2.329
1st pint.	1435.22	81.720	16.344	1456.28	83.744	16.749	1513.03	86.780	17.350	1049.95	63.562	12.712
5th 4 f 3	155.95	8.824	1.76	107.98	6.209	1.242	86.68	4.970	.994	157.24	9.518	1.904
6th 4 f 3	63.53	3.617	.723	57.41	3.301	.660	40.75	2.353	.471	109.09	6.603	1.321
7th 4 f 3	30.37	1.729	.346	32.41	1.863	.373	22.40	1.305	.261	123.90	7.500	1.500
8th 4 f 3	17.59	1.002	.200	21.50	1.225	.245	16.85	.973	.195	77.42	4.686	.937
2d pint.	267.44	15.230	3.049	219.10	12.598	2.520	166.88	9.901	1.921	467.65	28.307	5.661
9th 4 f 3	12.41	.708	.141	15.74	.905	.181	11.67	.674	.135	48.52	2.937	.587
10th 4 f 3	10.37	.596	.118	10.19	.586	.117	9.44	.544	.108	24.45	1.480	.296
11th 4 f 3	8.70	.500	.100	8.71	.500	.100	6.20	.373	.075	15.51	.942	.188
12th 4 f 3	6.11	.348	.069	7.96	.458	.092	5.93	.342	.068	11.85	.717	.143
3d pint.	37.59	2.141	.428	42.66	2.449	.490	33.34	1.923	.385	100.38	6.076	1.215
13th 4 f 3	5.74	.326	.065	6.30	.362	.072	5.74	.331	.066	10.37	.628	.126
14th 4 f 3	3.89	.221	.044	5.74	.324	.065	5.00	.289	.058	8.33	.504	.101
15th 4 f 3	2.96	.169	.034	4.82	.277	.055	4.44	.256	.051	7.78	.471	.094
16th 4 f 3	3.52	.200	.040	4.07	.230	.046	4.07	.235	.047	6.85	.415	.083
4th pint.	16.11	.917	.183	20.92	1.193	.240	19.25	1.111	.222	34.33	2.018	.404
Total.....	1756.36			1738.91			1732.50			1652.31		

late. This latter is assumed to be a fair index of the real value of each portion of the percolate. And if it be not a fair index, the error is on the safe side for practical results, as it always should be where accuracy cannot be attained. The medicinal value given in this column is calculated upon the whole amount of the extract yielded, and the numbers therefore indicate also so many twentieths of the total medicinal value. For example, the first four fluidounces of percolate of Experiment I. contains six and two hundred and ten one thousandths per cent. of extract that is medicinal and useful; or six

and two hundred and ten thousandths twentieths ( $\frac{6.210}{20} = 31.051$  per cent.) of the whole medicinal part of the extract. Hence, the second column, which gives the percentage of the total extract, inert and medicinal together, also indicates the percentage of medicinal extract alone, since a percentage is the same, whether calculated upon the 1756 grains of total extract, inert and medicinal together, or upon the 351 grains of medicinal extract alone, if the ratios be preserved.

It will be seen by this table, that the proportion of menstruum adopted by the Pharmacopœia for moistening the powder before packing is not the best. Secondly, That there is a remarkable difference in different lots of good bark, both in the progress of exhaustion and, as noticed before, in the character of the percolate in regard to the tendency to deposit less soluble matters, whilst the total amount of extract yielded and the proportion of alkaloids may not vary widely. Length of time seems to have much to do with this tendency to deposit, and possibly may account for the whole difference in this way. The new bark was in very fine powder, and was packed about as tightly in the percolator as the old. This caused it to percolate much more slowly; indeed, it percolated extremely slow,—was more than 48 hours in starting, and then gave about eight fluid-ounces in 24 hours. Under these circumstances, we may suppose that the menstruum, which became saturated with the less soluble matters, had time to deposit them again before escaping as percolate. The percolate might thus remain clear, as this did, and this process of solution, deposition, and resolution in the mass, would naturally postpone the final exhaustion of the powder, and distribute the extract obtained through a larger portion of the percolate, without materially affecting the total amount of extract, as really happened in the case of this bark, let the cause be what it may. These conditions and circumstances would not obtain in any known case, except that of cinchona bark, and therefore this is a good example of the most precarious and unfavorable application of economical percolation. Thirdly, That under ordinary favorable circumstances, the first 12 fluidounces, or the reserved percolate in calisaya bark, contains over 75 per cent. of its total value; the first pint over 86 per cent., and the



first two pints over 96 per cent.; and that the remainder is very dearly obtained at the expense of two pints of menstruum. And, finally, other percolations of these barks, in connection with these recorded here, show that slight variations in management do not materially interfere with the uniformity of the general results.

Starting from these experiments with colchicum seed and calisaya bark, thus studied out in detail with care, other drugs were extracted by percolation in a similar way. These were Nux Vomica, Gentian, Alexandria Senna, Short-leaved Buchu, and Cimicifuga. The writer has neither time nor opportunity for a series of details in connection with these drugs, such as would be interesting and might be useful, but must be contented with giving the results of the fractional percolations in a tabular form. This is the less to be regretted since any one can draw the deductions from the facts when stated. For convenience of review, the corresponding results from the tables of colchicum seed and calisaya bark are recapitulated in this general table:

TABLE III.  
*General Results of Official Percolations.*

DRUG REPRESENTED.	MENSTRUUM USED.	Total measure of percolate directed and obtained.	Total number of grains of dry extract contained in the total percolate.	Percentage of dry extract yielded by the drug to the official process.	Percentage of the total extract contained in the first 8 fluid-ounces of percolate.	Percentage of the total extract contained in the first 12 fluid-ounces of percolate.	Percentage of the total extract contained in the first pint of percolate.
Nux Vomica.....	Alcohol.....	60 fluid ozs.	866	11	54	66	72
Colchicum Seed.....	{ 2 measures Alcohol } { 1       "       Water }	44 "	1417	18	52	67	76
Short-leaved Buchu.....	Alcohol.....	44 "	1024	13	50	62	71
Alexandria Senna.....	Diluted Alcohol.....	48 "	2384	31	47	64	76
Cimicifuga.....	Alcohol.....	24 "	524	7	63	74	82
Cimicifuga.....	Diluted Alcohol.....	32 "	884	12	59	78	83
Gentian.....	Diluted Alcohol.....	44 "	2573	33	43	61	77
Calisaya Bark.....	Diluted Alcohol.....	64 "	1739	23	53	73	84
Do. do. New, slowly percolated.....	Diluted Alcohol.....	64 "	1652	22	39	52	64

The drugs selected afford examples which embrace all the important differences of condition met with in the Pharmacopœia; and those most difficult to manage were preferred. Thus, two examples of seeds were selected: one wherein alcohol is directed as the menstruum; the other, a mixture of alcohol and water. Two examples of leaves: one requiring strong alcohol, the other diluted alcohol. Two examples of roots: one requiring both strong and diluted alcohol, the other diluted alcohol. One example of bark was considered sufficient, as it is the most difficult of all to manage well.

The quantities used were strictly those of the official formulas; and the menstrua, and management, and the extent to which the percolations were carried, were also strictly official.

In conclusion, it may be confidently stated, that a very great and important economy in the use of alcohol in percolation may be effected by changing the official formulas which apply to the drugs experimented upon for this paper. And it may be fairly inferred, from these experiments, that this economy might be applied to all other percolations of official drugs. Should the Committee on Revision of the U. S. Pharmacopœia think the subject of sufficient importance to warrant a change in the official standard before the next decennial revision of 1870, or, practically, say 1872, we shall doubtless hear from that Committee on the subject.

Should we not hear from them in a legitimate and authoritative way, the writer of this paper earnestly forbids the use of the results here given, as indicating any short cut or justifiable economy whereby the official formulas are to be evaded or substituted. There can be but one standard, and there can be but one kind of honesty to that standard, namely, faithful obedience and truthful accuracy.

*Brooklyn, September, 1865.*

## AN AUTOMATIC VACUUM APPARATUS.

BY N. GRAY BARTLETT.

It is highly probable that, had the framers of our national Pharmacopœia foreseen the enhanced value of alcohol, many of the officinal formulas would have been greatly modified, to insure a more economical use of this important menstruum; and in no instance would this modification be more apparent than in the mode and temperature prescribed for the evaporation of spirituous liquids.

These defects have been the means of defeating, to some extent, the objects of the Pharmacopœia; the pharmacist, if he relinquish the preparation of those articles involving a great waste of alcohol, and purchase them of the wholesale manufacturer, neglects one of the most important duties of his avocation, while, if he ignore the authoritative directions in this respect, he establishes a most reprehensible precedent, an act not excusable by the plausible plea that equally efficient preparations are secured by this *alternative*.

The presumption is not unfounded; indeed, it is the conviction of the writer that, as a general rule, spirituous solutions of organic matter evaporated at 120°, 140°, or 160°, and, necessarily long exposed to the combined influences of heat and air, suffer greater injury than would ensue from the use of the water-bath still, the difference of temperature being more than compensated for by the exclusion of the atmosphere and the rapid concentration of the liquid.

Vacuum evaporation, which effectually precludes all danger of oxidation and of injury by an excessive degree of heat, is generally acknowledged to furnish products far superior to those otherwise obtained.

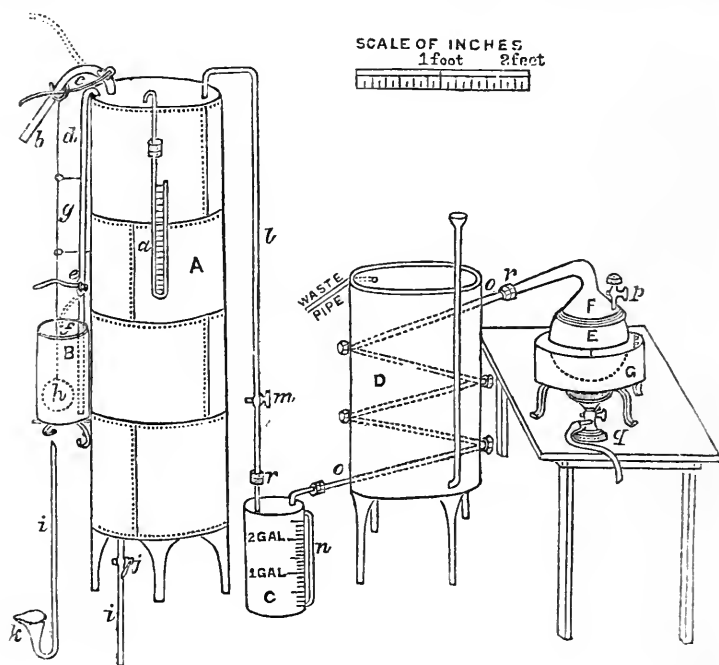
To secure this desideratum by the apparatus at present in use is attended, in addition to the large original outlay, with constant expense; as a consequence it is available only to the extensive manufacturer.

It is the object of this paper to call attention to a new form of vacuum apparatus, one which, it is believed, will recommend it-

self for its simplicity, its comparatively small cost, its automatic action and its inexpensive operation.

This plan was devised by the writer several years since, but it is proper to remark that it has never been put into actual practice.

The peculiarity of the method consists in the means employed for effecting the exhaustion; it is founded upon the well known principle of the Torricellian vacuum. Substitute for the barometric tube of thirty-four inches, one of water of as many feet,



	Dimensions in inches.	Capacity in gallons.
A—Vacuum chamber.....	18X60	66.09
B—Reservoir.....	7.5X13	2.48
C—Receiver.....	8X13.75	2.99
D—Condenser.....	18X28	
E—Still, with an eight inch opening.....	Diameter 11	2.82

F—Still head. G—Water-bath. a—Vacuum gauge; a bent glass tube communicating with the vacuum chamber. The closed limb is completely filled with mercury, which also slightly ascends into the other limb. Behind the tube is a scale of inches. b—Hydrant pipe. c—Stopcock, actuated by the float. d—Pipe allowing the egress of the air from the vacuum chamber, and also the escape of surplus water into the reservoir. e—Stopcock, closed by a spring attached to the rod, g. f—Spring. g—Rod connected with the float. h—Float. i—Pipe issuing from the bottom of the vacuum chamber. It is provided with a stopcock, (j) and is thirty-six feet long; its lower extremity being turned upwards and surmounted by the funnel, k. j—Stopcock. k—Funnel-shaped vessel, furnished with a spout. l—Tube connecting the vacuum chamber with the receiver. m—Stopcock. n—Glass gauge tube, showing the height of liquid within the receiver. oo—Condensing tube. p—Stopcock. q—Gas-burner. rr—Connection couplings.

expand its closed extremity to a larger chamber, and the discovery of Torricelli is again available for a practical use.

By consulting the annexed drawing and references, the apparatus will be readily understood; its operation is as follows:

The stopcock, *j*, being closed, cocks, *c* and *e*, are opened, (as shown in the drawing) and water enters from the hydrant pipe, *b*. When the vacuum chamber has become full, water flows through the pipe, *d*, into the reservoir, where it raises the float, *h*, and shuts the cock, *c*. The liquid to be evaporated having been introduced into the still, and the connections being properly made, cocks, *j* and *m*, are opened. The water immediately descends through the pipe, *i*, and at the same time it enters the vacuum chamber from the reservoir; the float, meanwhile, falls, leaving the cock, *c*, closed, (as shown by the dotted lines) and carrying with it the rod, *g*. The spring, *f*, in its descent, fastens upon the lever of the cock, *e*, closing it, (shown by dotted lines.)

Heat is now applied to the water-bath, and, after the lapse of a few minutes, the stopcock, *m*, is shut. A plentiful supply of cold water is made to circulate through the condenser, until the completion of the process.

The flow of water, when admitted to the vacuum chamber, is regulated by the "ball-cock" contrivance, which allows the vessel to be kept constantly full and ready for use, without attention. The reservoir, while it serves as a cistern for the float, provides for the filling of the pipe, *i*, at the commencement of the operation, without the admission of air to the vacuum chamber. When the cock, *j*, is opened, water ascends the pipe, *d*, on the principle of the syphon, and, as the capacity of the reservoir is about double that of the pipe, *i*, the latter will have been completely filled before the cock, *e*, is closed by the fall of the float.

The pipe, *i*, being full, the water will escape until it reaches a height corresponding to the atmospheric pressure; this point is, however, some distance below the vacuum chamber, as the column of water, thus supported, would rarely exceed thirty-four feet. An absolute vacuum is not obtained by this means, because of the ready diffusibility of aqueous vapor, and the escape of air and absorbed gases, from the water.

It was feared that the large amount of carbonic acid gas frequently present in this fluid would render it necessary to intro-

duce some absorbent into the vacuum chamber. It was observed, however, that no material depression of the mercurial column arose from this cause; a fact sufficiently explained by the supposition that the escape of the water is so rapid that none of its gaseous constituents can be disengaged.

The confined air diffuses itself throughout the entire apparatus, and as the capacity of the vacuum chamber is ten times that of the still, condensing pipe and receiver combined, but one-eleventh of the original atmospheric pressure is present; a repetition of the process would increase the tenuity of the air to 121 times that of its normal condition.

As the temperature of the water furnished to our cities probably never exceeds  $75^{\circ}$ , and the tension of its vapor at this degree of heat is equal to but  $\cdot 85^{\circ}$  of an inch of mercury, this contrivance is capable, under the most unfavorable circumstances, of producing a degree of exhaustion expressed by less than one inch of mercury.

The vacuum is maintained by the condensation of the vapor proceeding from the still, by an ample supply of cold water to the condenser. If the connections be perfect, distillation will proceed so long as the proper difference in the temperature of the still and condenser is preserved.

The gauge-tube of the receiver shows the quantity of the distillate, which indicates approximately when the process should cease.

The still could be made more convenient by the addition of a syphon tube to the cock, *p*, for the purpose of introducing more liquid without destroying the vacuum; a "proof-stick" and a thermometer might be inserted with equal advantage. By employing two vacuum chambers, and a suitable arrangement of floats and valves, the process could be rendered continuous and entirely automatic.

This apparatus would be particularly applicable to the wants of the manufacturing pharmacist.

The fact that it can only be advantageously employed in those localities where water works exist, detracts somewhat from its utility.

*Chicago, Ill., August, 1865.*

*Proc. of the Amer. Pharm. Asso., 1865.*

## ON THE MANUFACTURE OF COMMERCIAL CARBONATE OF AMMONIA.

By J. CARTER BELL, F.C.S., Associate of the Royal School of Mines.

This salt must have been known even to the alchemists, as it forms one of the chief constituents of putrid urine, but there seems to be no evidence that it was manufactured previously to this century; indeed, one would hardly think that they knew the difference between ammonia and its carbonate. The real difference was first pointed out by Dr. Black, of Edinburgh.

Carbonate of ammonia is formed by the putrefaction of animal substances, and by the destructive distillation of animal matter.

In the destructive distillation of bones, carbonate of ammonia is produced, and also water with the oil called "Dippel's oil," with some incondensable gases. The condensed liquors from the carbonization of bones separate in two distinct forms—the oily and the aqueous products—the latter containing the carbonate of ammonia; the salt can be separated by sublimation.

Many processes have been tried for the manufacture of this compound. I am informed by Mr. John Hogarth (who has been engaged in this chemical operation for forty years) that in the year 1825 a Mr. Holmes manufactured this salt in the old Haymarket, Liverpool; it was made from stale urine, and the resulting blocks were very small, weighing about six pounds. At the present time the weight of a block is about two hundred-weight.

On March 11, 1844, Dr. Wilton Turner took out a patent for obtaining salts of ammonia from guano. The guano is subjected to a destructive distillation in close vessels at a low red heat during the greater part of the operation, but the temperature is increased towards the end. The products of distillation are collected in a series of Woulfe's bottles, by means of which the gases evolved during the operation may be made to pass two or three times through water before escaping into the air. The products consist of carbonate of ammonia, hydrocyanic acid, and carburetted hydrogen; the first and second

are rapidly absorbed by the water, with the formation of a strong solution of hydrocyanate and carbonate of ammonia.

In 1849 Mr. Hills took out a patent for obtaining carbonate of ammonia from guano. To effect this the guano is first mixed with charcoal or powdered coke; the mixture is then heated, and the carbonate obtained by sublimation. Peat has been experimented on for the production of this salt; whether it will be an economical process remains to be proved. Mr. Hills took out a patent for obtaining ammonia from peat, and Mr. Rees Reece in 1849 also had a patent very much like Mr. Hills'. The first part of the patent is for an invention for causing peat to be burned in a furnace by the aid of a blast, so as to obtain inflammable gases, tarry and other products. The tarry products may be employed to obtain paraffine and oils for lubricating machinery, &c., and the other products may be made available for evolving ammonia, wood spirit, and other matters by any of the existing processes. On July 27, 1849, a statement was made in the House of Commons to the effect that 100 tons of peat would produce 2602 pounds of carbonate of ammonia.

In 1841 Mr. Laming took out a patent for manufacturing carbonate of ammonia by mixing its separate acid and alkaline constituent, instead of by the decomposition of ammoniacal salt. One of the processes used is to cause ammonia and carbonic acid gas obtained separately from any convenient sources to traverse a succession of leaden chambers maintained at as cool a temperature as may be conveniently practicable, and so continued as to favor the admixture of the dissimilar gases. In this process it is not essential that the two gases be present in their combining proportions; it is preferable that the carbonic acid be in greater abundance than will combine with the ammonia which is present. Sometimes a stratum of water, or of water impregnated with ammonia, is placed in one or more of the leaden chambers. Carbonic acid and ammonia in the form of gas are then introduced; in which case, it is stated, a larger proportion of carbonic acid gas is found in the resulting salt, or saline solution, than when only the hygrometric moisture of the aëriform fluid is present. Mr. Laming also converts

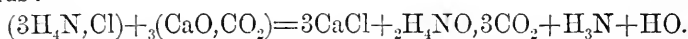


the hydrosulphate of ammonia contained in gas liquors into carbonate of ammonia by the following process:—A mixture of deutoxide of copper and charcoal, or other form of carbon in fine powder, in the proportion of twelve parts by weight of the former to one of the latter, is introduced into a retort made red hot and furnished with an eduction pipe which passes through cold water and finally enters into the gas liquor. The formation of carbonic acid gas soon takes place by the union of the carbon with the oxygen of the metal, and this gas combining with the base of the hydrosulphate of ammonia converts it into carbonate, with liberation of sulphide of hydrogen. When the carbonic acid ceases to come away, nearly all the carbon will have disappeared from the retort, and the oxide of copper reduced to the metallic state. The charge is then drawn, and left to cool while a second charge of similar materials is being worked off; during which time the copper reabsorbs oxygen from the air, and becomes again deutoxide of copper, which may be used anew with fresh carbon.

Messrs. Crane and Tullien, in their patent of January 8, 1848, describe a method of manufacturing ammonia in the state of carbonate, hydrocyanate, or free ammonia by passing any of the oxygen compounds of nitrogen, together with any compound of hydrogen and carbon, or any mixture of hydrogen with a compound of carbon, through a tube or pipe containing any catalytic or contact substance. The substance which is preferred is platinum in the state of sponge, or asbestos coated with platinum. This is to be placed in a tube and heated to about  $600^{\circ}$  F., so as to reduce the temperature of the product, and at the same time prevent the deposition of carbonate of ammonia, which passes onward to a vessel of the description well known and employed for the purpose of condensing carbonate of ammonia. The condenser for this purpose must be furnished with a safety pipe, to allow the escape of uncondensed matter, and made to dip into a solution of any substance capable of combining with hydrocyanic acid or ammonia.

Carbonate of ammonia is manufactured at the present time from a mixture of sulphate or chloride of ammonium and

common chalk, heated in retorts and sublimed. The decomposition of the chloride of ammonium may be represented thus:—



In the manufacture of ammonia alum, the ammonia is derived from gas liquor; the liquor is heated, and nearly all the volatile ammonia driven off. The residue is taken out of the boilers and used for the manufacture of carbonate of ammonia. It is treated with a little acid till it is neutral, then evaporated by means of heat in large hemispherical iron pans set in brickwork. When it has arrived at the crystallizing point, it is allowed to cool, and crystals are then deposited; or the hot liquor may be run into other coolers for crystallization. The mother liquor is syphoned off, and then the inside of the pan is seen studded with intense black crystals, of the prismatic form when sulphuric acid has been used for the neutralization, and cubical with hydrochloric acid. The crystals are now shovelled out of the pan and washed with the mother liquor. They are then re-dissolved, the liquor run into coolers, and re-crystallized. In the re-dissolving a great deal of sediment is deposited, consisting chiefly of the matter mechanically locked up in the crystals. The crystals when dry are of a dirty white color; they are now ready for the next operation of converting them into carbonate of ammonia. For this purpose cast-iron retorts, the shape of an elongated muffle, are used. The neck of the retort is round, and closed with an iron door, kept in its place by means of a screw. The retorts are about seven feet long and one and a-half deep. Three are set in brickwork in the form of a triangle, and heated by one fire. They communicate by means of iron pipes with a leaden chamber which is technically called a balloon. It is about six feet high, eight long, and two and a-half wide. These balloons are supported upon scaffolding so as to be on a line with the retorts, and are kept in their places by means of iron bands. At the bottom of each balloon is a small pipe, which is always kept open to allow for the escape of steam, and water highly charged with carbonate of ammonia. There is a constant dropping from this pipe, which is collected in a pail, and re-sublimed. If this

pipe was not there, the pressure inside the balloon might cause it to be blown off the scaffolding. Great attention has to be paid to the heating of the retorts. If they were heated too strongly, most disastrous results might occur.

The retorts are charged once every twenty-four hours with a mixture of carbonate of lime and ammoniacal salt; the chalk is well dried on an iron plate which is set over the flue, so that the waste heat of the fires economically dessicates it. All the retorts are not charged at the same time, for often there are five and six sets; if they were, the labor would be too great, and a greater number of men would be required; but to do away with that difficulty one retort in each set is charged at the same hour every day; the first charging takes place at seven, the second at eleven, and the third at three, and by that time the whole of the retorts have been charged. The contents are frequently stirred up with long iron rods (which are pushed through holes made in the door of the retorts) to assist the decomposition. Before a new charge is put in, the pipes leading to the balloons are well cleaned out, as they are very liable to become stopped up. The used-up charge, which consists principally of chloride of calcium, is drawn out into an iron barrow and wheeled away to some waste ground; the new charge (which is generally two of chalk to one of the salt) and which has been carefully weighed and well mixed, is thrown quickly into the retort, the door is luted on, and then the retort is left for twenty-four hours, the contents receiving an occasional stir.

When the retorts have been worked for about fourteen days, the balloons are opened, and the impure carbonate is found as a thick crust lining all the sides; it is deposited in different colored layers, according to the impurity of the carbonate. The chief impurities will be carbonate of lime and chloride of calcium, which are carried over mechanically; the salt is well scraped down from the sides, and the balloon prepared for another fourteen days' operation. These balloons have to be of considerable size, or there will be much waste from the salt being carried off by the steam; in each balloon is a small test-hole, closed with a plug of wood; this is for telling how the

sublimation is going on. The impure carbonate is all collected and taken to the resublimation pans. The salt is put into iron tanks about sixteen feet long and two and a-half deep; they are wider at the bottom than at the top, being two feet seven inches at bottom and two feet at top. These tanks are closed with two plates of iron with four holes in each, about one foot in diameter and one foot apart from each other. Over every hole is placed a conical leaden vessel with a flat top. These vessels are formed of a sheet of lead, and the two ends are kept together by means of staples and wedges; a circular piece of lead is luted on the top of these receivers; the height of them is about two feet. The tanks are set in brickwork, with a fire-place at each end. They are charged every fortnight; a certain quantity of water is first put in, then the impure carbonate. The receivers are all luted on over their respective holes, and a small fire made at each end of the tank. Great care is required in regulating the temperature, because the heat must not be too high, as the salt sublimes from  $120^{\circ}$  to  $130^{\circ}$  Fahrenheit. In the end receiver is a small hole closed by a plug; on taking this out it can be seen whether the temperature is too high; if it is, the fires have to be damped. A thermometer is generally used, but some people prefer to trust to their own judgment. Instead of the tank and fires separate pots may be used, each one being surmounted by a leaden cap; these pots are either set in brickwork and heated by the flue of the retort furnace, or they may be set in a water bath. At the end of fourteen days the leaden receivers are lined with a thick crust of carbonate; they are taken down, and the lead stripped off; the outside of the block is rather dirty, it is well scraped, and then broken into pieces, packed in jars, and sent to the market. The leaden receivers are well washed and re-shaped. A small quantity of the residuary liquor is taken out of the tanks, but the chief part is left in, a fresh charge of carbonate is added, the receivers are luted on, and the operation goes on the same as before.

The greatest use which is made of this salt is by bakers and confectioners; it is largely employed in medicine and in the manufacture of smelling salts.—*Lond. Chem. News*, Dec. 29, 1865.

## EXTRACT OF COD LIVER.

[NOTE.—In the December number of the Pharmaceutical Journal, Dr. Attfield, of the Pharmaceutical Society's Laboratory, under the caption of "Analysis of a quack imposture," severely criticizes a preparation prepared in Paris and sold in London, called "*Oleo-Morrhaine or Saccharide of Cod Liver Oil*," which professes to be a saccharine powder imbued with cod liver oil in a state of minute division, and to be greatly more efficacious than cod liver oil. Dr. Attfield states that the powder contains no oil, and that he could not detect chlorine, bromine, iodine, phosphorus or sulphur, which the label alleges are ingredients, and believes it to be wholly lactine.

In the January number of the same Journal, is a communication from Dr. Le Thiere, the inventor of the preparation, to Dr. Attfield his critic, in which he asserts that sulphur, iodine, bromine and phosphorus are present, and that an authenticated analysis will be published. Dr. Attfield did well to expose this bold piece of quackery, but he may after all be mistaken in asserting the absence of all except the oil. The extract of cod livers, sold in the form of drageés and pills, appears to have some claims to merit, and was brought to the notice of the Pharmaceutical Society, at its meeting held Jan. 6, 1866, (see *Pharm. Jour.*, for January, 1866,) by Mr. Squire, who called the attention of the members to the composition of the watery extract of cod livers. "He had brought with him the extract resulting from the evaporation of the water which oozes out of cod's liver when extracting the oil. He finds that on the average 28 lbs. of large and fresh livers yield 12 lbs. of oil, and 2 ounces of aqueous extract resulting from the evaporation of the water. It has been represented in the advertisements of a medicine called '*Cod Liver Drageés*,' that five grains of the purified extract equal a tablespoonful of cod liver oil. It was this startling announcement that induced him to have the water collected and evaporated, in order that the members of the Society might examine the product and judge for themselves, and, if it was thought worth while, to have it analyzed in their laboratory. He thought it was highly important to know whether or not we were throwing away so valuable a part of the livers as this statement indicated."

A gentleman present explained that the "cod liver extract" was not a secret remedy, but was patented and read a specification.

Some discussion followed evidencing a disposition unfriendly to the preparation on the plea that it was not the business of the Pharmaceutical Society to expose nostrums or to make therapeutic experiments; notwithstanding this, we believe the subject worthy of consideration.

There are two views of the action of cod liver oil; one, that it proves curative through the agency of certain mineral and organic constituents, which are contained in cod livers and a portion of which are retained by the oil; the other, that cod liver oil itself has a great fitness for assimila-

tion, and acts through its tonic effect in the process of assimilation and nutrition. Some also believe it to unite these properties in its therapeutic action. Now, if it be true that the various principles which have been attributed to this oil are derived from the fluids of the hepatic organ, is it not probable that the pure oil itself, as secreted in the cells of the liver, is not imbued with them to much extent, and that it is only when the tissues are broken up in the extraction of the oil, that the latter assumes these ingredients? This at least is reasonable, and if these ingredients be really important, why should we not expect valuable curative results from an extract embracing the soluble constituents, not oleaginous, of the cod livers? The following paper referring to this subject is not satisfactory, but will serve to introduce the subject to our readers.—EDITOR AM. JOUR. PHARM.]

To the Editor of the CHEMICAL NEWS :

*Sir*,—Will you kindly grant me space in your columns for a few observations in reference to your necessarily brief report of the Pharmaceutical Society of the 6th inst., at which the claims of the new extract of cod livers were discussed? My apology for again intruding on you must be the general interest of the discovery that the watery constituents of cod liver, which have been hitherto deemed of no value, and thrown away, are really richer in medicinal substances than cod liver oil.

The 28 lbs. of cod liver from which Mr. Squire was only able to produce 1 lb. of aqueous matter must have lost much of their water before coming into his hands. The 15 lbs. of liver which remained after the withdrawal of the 12 lbs. of oil and 1 lb. of water evidently still contained much aqueous liquid.

The waters of cod liver, when skilfully obtained, constantly yield 15 per cent. of extract. Mr. Squire seemed to have got no more than 12 per cent.

The extract, when properly prepared, contains fully 78 per cent. of organic and inorganic matters (exclusive of oil); while cod liver oil, according to the best known analyses, contains only 1.024 per cent. Hence, in one tablespoonful of the latter, which comprises 240 grains, there are present scarcely  $2\frac{1}{2}$  grains of the organic and inorganic matters of which the extract is almost entirely composed.

What is the chemical and medicinal nature of this extract? On the authority of the French analyses and official report, I assert that it is composed of the very substances—namely, fish-

bile constituents and inorganic elements which distinguish cod liver oil from all other animal oils and fats; and I challenge the Pharmaceutical Society to determine by analysis the value of that assertion. To this the Society reply, that although they consider it their duty to undertake the analysis of such preparations as would appear to come short of the pretensions of their authors, it is no concern of theirs to analyze those that seem likely to prove genuine; in other words, their province is to condemn, but never to approve! It was meritorious in them to proclaim to the world by Dr. Attffeld that Le Thièrè's "cod liver oil powder" was an imposture, because it contained no traces of chlorine, iodine, bromine, sulphur and phosphorus; but it would be contrary to their policy to undertake an analysis which might result in showing that Guffroy's cod liver extract was a product peculiarly rich in those and other important bodies.

With regard to that part of the subject which was admitted to be wholly beyond the province of the Pharmaceutical Society—namely, the remedial properties of the extract, I must protest against the unfairness of the proposal made by the Chairman, Mr. Hills, that an individual member of the Pharmaceutical Society (Mr. Squire) who, as well as Mr. Hills, is a manufacturer and vendor of cod liver oil, should "induce a medical friend to make some experiments with the extract, and report to the Society."

Mr. Squire's medical friend to experiment in private with cod liver extract privately prepared by that gentleman, who has only recently heard of the substance, and is evidently not master of the process of making it, in order that the Pharmaceutical Society might arrive at a knowledge of the medicinal value of the extract prepared by M. Guffroy, who has devoted six years to the practical study of the subject. !!!

But the medical experiments suggested by Mr. Hills have already been made. Not to mention those that have been going on for five years on the Continent, extensive trials of Guffroy's dragées of cod liver extract have, during the last six months, been made in London. At St. Mark's Hospital, where my request for experiments with the extract was received in a liberal spirit by Mr. Gowlland, one of the surgeons of that institution,

the new preparation has been distinctly proved by him to be so superior in remedial effects to cod liver oil, that for some considerable time back it has almost entirely superseded the oil in his practice in that hospital. This statement is open to verification by any one who chooses to make inquiries in the proper quarter.

If Messrs. Hills and Squire, who must have many friends among the hospital physicians and surgeons of London, will consent to procure further serious trials of Guffroy's extract in one or more of the large metropolitan institutions, I shall be much pleased; and I beg here to inform those gentlemen that I shall be ready to supply gratuitously sufficient prepared cod liver extract for the treatment of a large number of patients, provided the medical attendants will undertake to permit a medical gentleman on my behalf to take part in the experiments, duly to record the cases, and to publish them in the medical journals.

I am, &c.,

JOHN BARR.

83 Fleet Street, December 27, 1865.

*Table Exhibiting the Comparative Composition of Cod-liver Oil and Cod-liver Extract.*

	Cod-liver oil.	Cod-liver extr.
Oily acids and glycerin . . . . .	95·967	none
Fish-bile constituents . . . . .	0·318	60·620
Propylamina . . . . .	occasional trace	2·545
Acetic, lactic, and butyric acids . . . . .	0·120	6·000
Phosphorus and phosphoric acid . . . . .	0·113	2·090
Sulphur and sulphuric acid . . . . .	0·071	·200
Iodine . . . . .	0·037	·154
Chlorine, with trace of bromine . . . . .	0·149	1·525
Soda . . . . .	0·055	1·170
Magnesia . . . . .	0·009	·366
Lime . . . . .	0·152	·510
Potash . . . . .	none	·211
Ammonia . . . . .	none	2·862
Water and loss . . . . .	3·009	21·847
	<hr/> 100·000	<hr/> 100·000



The extract is thus shown to contain 135 times as much of bile-constituents and other organic substances (exclusive of oily matter) as the oil, and 15 times as much of inorganic elements. Those two classes of bodies together form 78·153 per cent. of the extract, but only 1·024 of the oil. In a tablespoonful of the oil, which comprises 240 grains, there are therefore present hardly  $2\frac{1}{2}$  grains of the above matters, while the extract is almost wholly composed of them.—*London Chemical News*, Jan. 5, 1866.

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#### PANCREATIC EMULSIONS.

Of all the new remedial agents which are now being employed by the medical profession, the Pancreatic Emulsions, introduced by Dr. Dobell, are perhaps the most noteworthy. Some time must elapse before their real value can be established: but the satisfactory results which have already been obtained with them in the treatment of consumption, will induce all physicians, who keep pace with the age, to give them a fair trial. Should they prove as useful as Dr. Dobell believes them to be, their introduction will be referred to with delight, by those who maintain that medicine can make but little progress until therapeutics and physiology are more firmly united. The Pancreatic Emulsions are rational remedies, and were devised to counteract the wasting effects of a morbid condition which Dr. Dobell detected in consumptive patients. Some years ago, Dr. Dobell's attention was directed to the fact, that many consumptive patients disliked fat, and the results of a careful examination of a series of cases which came under his notice at the Royal Infirmary for Diseases of the Chest, proved that this dislike for fat was common to the great majority. These results closely corresponded with those published directly afterwards by Mr. Jonathan Hutchinson, in a valuable suggestive paper, "On the form of Dyspepsia which often precedes and attends Phthisis." With a view of testing by direct experiment, whether this dislike for fat was due to some abnormal condition of the pancreatic secretion, Dr. Dobell determined to treat a series of cases of consumption with the pancreatic juice of the pig. After many tedious experiments, in which he was assisted by Mr. Heathorn, a rising

young chemist, an emulsion of beef-fat, with the pancreatic juice, was adopted as the most eligible preparation. This was supplied to the patients, who were ordered to take it stirred in milk. The emulsion could be mixed readily with the milk and in the proportion of half an ounce to a breakfast-cupful of milk, formed a drink that was not unpleasant. Twenty-four patients of the thirty-three treated with the emulsion, were discharged after eight weeks, in an improved condition with respect to their general symptoms. The emulsion disagreed with three patients only, whereas cod-liver oil disagreed with eleven out of the twenty-four to whom it was administered. A second series of cases were afterwards treated with the pancreatic emulsion of fat, or with a pancreatic emulsion of lard oil, and similar satisfactory results were obtained. Mr. Heathorn being prevented by his other engagements from preparing the emulsions in sufficient quantity to meet the increased demand produced by many medical men prescribing them, Dr. Dobell sought and obtained the valuable assistance of Mr. Schweitzer, the scientific chemist in the establishment of Messrs. Savory and Moore, and these preparations are now made by this celebrated firm. The principal preparations are: 1. Pancreatic emulsion of solid fat. 2. Pancreatic emulsion of cod-liver oil. 3. Pancreatic emulsion of lard-oil. The first of these appears to be the favorite remedy with the medical profession. It is a white paste of the consistence of thick Devonshire cream. It remains good for a long time, though the pancreatic juice, unmixed with fat, rapidly undergoes decomposition. The dose is from one to three teaspoonfuls, once or twice a day, in a cup of milk, to which a little brandy may be added. It is to be taken two hours after a full meal. A fourth preparation, recommended by Dr. Dobell, is Pancreatine in capsules or globules, but up to the present time, Messrs. Savory and Moore have been unable to find a suitable material for the capsules which will resist the action of the agent.

According to Claude Bernard, the great French physiologist, the pancreatic juice is the most important secretion of the digestive organs, and possesses the property of emulsifying fats, of transforming starch into sugar, and of acting on albuminous substances. Some physiologists do not adopt Bernard's view, but

all agree that the pancreatic juice helps to render fats easy of absorption.

The following extracts from one of Dr. Dobell's reports will show the value of any means for promoting the assimilation of fat in consumptive patients, and also explain the frequent failure of cod-liver oil to sustain the improved condition which so often occurs when it is first administered:—"According to the careful estimate of Dr. Lyon Playfair, the quantity of fat required by an adult in twenty-four hours, to keep up healthy nutrition, is from 1 oz. to 2·5 oz.; and according to the estimates made from numerous and carefully-selected data by Mr. Farrants and myself, the quantity is from 2 oz. to 3·5 oz. We may fairly assume, then, that not less than two ounces of fat per day, on an average, is required to keep up healthy nutrition in an adult. We have next to bear in mind that, before a case of consumption ordinarily attracts attention, and begins to be treated as such, many pounds weight, principally consisting of fat, have been gradually removed from the body. In this condition—1, a deficiency of fat throughout the organism; 2, a loss of the power to assimilate ordinary fats; 3, a constant demand for two ounces per day, to maintain the healthy nutrition,—we administer cod-liver oil, in the belief that this form of fat will assimilate when other forms will not. Supposing that it agrees, and that some or all of it is utilized, a rapid improvement takes place in the patient, from the supply of some of that for want of which life was steadily fading—very much as a cut flower that has drooped for want of its supply of sap rallies and recovers freshness for a time when put into water. But there are very few persons who can take more than half an ounce to one ounce of oil per day—few who can even take this steadily from week to week without intermissions. But supposing an ounce or an ounce and a half per day to be taken regularly, how is this to supply, not only the two ounces per day required for healthy nutrition, but all the extra ounces of arrears that were lost before the treatment was begun? But assuming the possibility of two ounces per day of oil for nutrition, and another two ounces for arrears, being taken and utilized, even then the whole thing may be unstable and may break down, from the fact that we are supplying oil and not solid fat—a

body rich in olein and poor in stearin and margarin, in the place of bodies rich in stearin and margarin and poor in olein, such as the fats taken in normal food.

"The practical conclusion from these considerations appears to be, that if we are to give a fair chance of recovery to a patient deprived of the natural powers of digesting and assimilating fats, we must, by one means or another, secure that two ounces of fat of average solidity are utilized every day for the purposes of nutrition, and an additional ounce or two to make up for arrears."

If the pancreatic juice of the pig artificially introduced into the digestive apparatus does really cause a fair proportion of this amount of fat to be assimilated, the pig's "sweetbread" must be regarded as one of the most important articles of the *Materia Medica*. B.

*The Chemist and Druggist*, Jan. 15, 1866.

#### NOTES ON THE SOPHISTICATION OF RECTIFIED OIL OF AMBER, OLEUM SUCCINI RECTIFICATUM, U. S. P.

BY ALBERT E. EBERT.

Having recently observed that a specimen of "rectified oil of amber" was insoluble in stronger alcohol, a further investigation of the subject was deemed desirable. The oil in question, upon a closer examination, was found to have none of the characteristics of the genuine article, as described in the books, but to bear a striking resemblance to "Kerosene," or some similar product obtained by the distillation of petroleum or bituminous coal. I procured several specimens of the oil, from different sources, with the idea of ascertaining the quality of it as found, at present, in the market.

None of these samples bore any analogy to the genuine oil, but appeared to be sophistications. Two of the five samples I obtained corresponded with the original specimen in resemblance to Kerosene while an equal number appeared to be merely re-sinified oil of turpentine. These latter specimens were obtained from dispensing Pharmacutists, while the remaining ones ("Kerosene variety") were furnished by reliable wholesale

druggists. The fifth sample was represented to me as a genuine article of crude oil of amber, and as it appeared to have some of the properties of the true oil, I determined to prepare from it the rectified article.

It was a thick, dark colored liquid, with an empyreumatic tarry odor, partially soluble in stronger alcohol, and having the sp. gr. 1.045 at 60° F. I subjected sixteen fluidounces of this commercial crude oil in a glass retort to distillation, with the requisite quantity of water, as directed by the U. S. P. After distilling over nearly all the water, I found that the yield of rectified oil was not quite two fluid drachms, although the mixture had been kept at a constant boiling temperature. This result led me to think that either by a previous distillation it had been deprived of its essential oil, or that it was an adulterated article. I procured 2lbs. av. of amber ("Succinum,") which was first subjected to an examination and found to be a true article.

It was mixed with an equal weight of sand, placed in an iron retort, and subjected to heat. Vapors of a white color were abundantly evolved, which, when inhaled, excited coughing. These vapors, when passed through water, were dissolved, and the solution, after concentration, deposited crystals of succinic acid. The oil soon came over quite rapidly, the first portion of a yellowish color, which was followed by a thick, dark colored liquid; heat was continued until volatile matter ceased to pass over.

From twenty-nine troyounces of the resin I obtained twenty-one fluidounces of crude oil of a very dark color, having a strong succinic, empyreumatic odor, and the sp. gr. .985 at 60° F. Twenty fluidounces of this crude oil were mixed with seven and a-half pints of water placed in a glass retort, heat applied through means of a sand bath, and distilled until five pints of the water with the oil had passed over into the receiver. I would here remark that, to maintain the mixture at a constant boiling temperature, in a glass distillatory vessel, I found it necessary to cover the head and neck of the retort with a tin hood, thereby retaining the heat. When this not observed, the yield of the volatile oil will be considerably

smaller. The oil, when separated from the water, measured two and a-half fluidounces, ( $12\frac{1}{2}$  per cent.) This is the *Oleum Succini Rectificatum* (U. S. P.) having an amber color, and the peculiar succinic odor, sp. gr. .903 at 60° F., beginning to boil at 339° F. and its temperature continuing to rise to 367° F., soluble in alcohol to a limited extent, but dissolving in all proportions in chloroform, ether, bisulphuret of carbon, and the fixed oils. The residue left in the retort after the distillation of the rectified oil of amber, (U. S. P.) was of a brown color, sp. gr. 1.019 at 60° F., having the consistence of simple syrup, and possessing to a marked degree the odor of the oil of amber; it was partially soluble in stronger alcohol. This residue had, to a marked extent, a resemblance to the commercial article sold as crude oil of amber.

The annexed table shows the properties of, and the action of reagents upon the several oils examined. (See page 149.)

The conclusions based upon the foregoing experiments are, first, that rectified oil of amber is extremely scarce, if not entirely absent from the market; secondly, that the articles sold as such are Kerosene, modified, perhaps, by heat, and resinified oil of turpentine.

I observed that Kerosene, when heated to 360° F. and upwards, lost much of its coal-y odor, acquired an amber color, and was rendered very-similar in appearance to the commercial rectified oil of amber, as seen by sample upon the table, and that the change became more apparent with an increase of heat, as seen by another sample. The commercial oil, under the same conditions, suffered similar changes.

This Kerosene variety, when exposed to direct sun-light, is distinctly opalescent, and it is further distinguished from the genuine oil by its insolubility in alcohol, and the absence of a resinous body when treated with nitric acid. It is inferred that this variety represents the article now furnished to the trade, as the remaining samples were from dispensing establishments where they had long been in stock. The latter variety, (turpentine,) is sufficiently distinguished by its odor, and violent fulminating action with iodine.

The product of the oxidation of forty grains of true oil of

	<b>RECTIFIED OIL OF AMBER.</b> U. S. P.	<b>COMMERCIAL RECTIFIED OIL OF AMBER.</b> <i>Two samples, resembling Kerosene in physical properties, having similar deportment with reagents.</i>	<b>COMMERCIAL RECTIFIED OIL OF AMBER.</b> <i>Two samples, having the characteristic properties of Oil of Turpentine.</i>		
<b>PHYSICAL PROPERTIES.</b>					
Sp. gr. at 60° F.	.903	No. 1. 823	No. 2. 831	No. 1. 878	No. 2. 895
Boiling point.	339° F.	No. 1. 228° F.	No. 2. 292° F.	No. 1. 303° F.	No. 2. 312° F.
Solubility in stronger alcohol. Sp. g. 817 at 60° F.	1 part of oil in 4 parts alcohol.	Not soluble; forming when shaken together a milky mixture, the oil separating on standing, and sinking to the bottom of the vessel.		No. 1: 1 part oil in 3 parts alcohol. No. 2: 1 part oil in 4 parts alcohol.	
Solubility in alcohol. Sp. gr. 835 at 60° F.	1 part of oil in 17 parts alcohol.	Not soluble.		1 part oil in 8½ parts alcohol.	
<b>ACTIONS WITH REAGENTS.</b>					
Bromine.	Very violent reaction, giving off white fumes, the liquid changing in color from a pink to a purple, then to a green, and ultimately to a brown, forming a uniform mixture.	Violent reaction, with effervescence and generation of white fumes, the bromine dissolving slightly in the oil, precipitating a little brownish resinous matter, forming two layers.		Violent fulmination, with evolution of white fumes; much of the oil was thrown out of the dish. On the addition of more bromine, the same action was observed.	
Maisch's Solution Bromine.	No violent reaction, forming two strata, the lower layer passing through the different shades of pink, purple and a reddish-brown.	The solution of bromine sinking to the bottom, producing no perceptible change on the supernatant oil.		Evolving white fumes, forming two layers, the upper being of a pink, and changing to a green color, the lower stratum, at first of a purple, becoming dark brown on standing.	
Iodine.	Without any visible reaction, forming a dark brown thick liquid, with a slight deposit, which is afterwards dissolved in the upper stratum.	Soluble only to a very slight extent, the oil assuming a pale red color, gradually changing to a dark brown.		Fulminates with energy, giving off violet vapors, the temperature rising from 72° F. to 152° F. (80 deg.), the oil changing in color to a reddish-brown, with a precipitate of a soft dark brown mass, emitting a terebinthaceous and empyreumatic odor.	
Maisch's Solution Iodine.	On the addition of the etherial solution to the oil, a spreading of the mixture is produced, which extends to the rim of the crystal, returning to the centre, leaving undulating lines on the sides of the crystal. On standing, it forms two layers—the upper of a reddish brown color, the lower dark brown, of a thick consistence.	Producing also a spreading, but with circular wavy lines, the upper stratum being of a light red, and the lower of a dark brown color.		No violent reaction, and but little spreading, the solution settling to the bottom of the crystal having acquired a dark brown color, the upper stratum having a light red color.	
Sulphuric Acid.	Producing a deposit of a reddish brown color, having a resinous appearance.	It only imparts to the acid which sinks to the bottom of the crystal a reddish brown color, with comparatively little deposit.		Emitting white fumes of a terebinthinous odor, the acid forming with the oil a compound of a reddish-brown color.	
Hydrochloric Acid.	Forming two layers, the oil assuming a reddish color on standing.	No change in color.		Forms two layers, the oil changing to a yellowish green color; when mixed together by agitation, a milky mixture is produced.	
Nitric Acid.	Changing the oil at first to a red, which becomes darker in color. On standing some time, a large quantity of a brown resinous matter is formed on the surface.	No change in color is perceptible. After standing 24 hours, a film is produced of a light yellowish color, floating on the surface of the mixture.		No change at first, but after standing 24 hours a light brown color is produced, forming two layers.	

amber, by one hundred grains of nitric acid, weighed thirty-four grains. This substance was partially soluble in alcohol, wholly so in liquor potassæ, from which it was precipitated by a dilute acid.

When dry it had the sp. gr. 1.103, broke with a resinous fracture, and was readily reduced to powder. This is the article described as "artificial musk," but it possessed none of the odor of that substance. Although well washed, it still retained a strong nitrous odor.

NOTE.—Since writing the above, I have been led into the "secrets of the trade" by one of the "initiated," who informs me that the "rectified oil of amber" is prepared by agitating turpentine with the crude oil, until the desired shade of color is acquired, when it is separated and offered for sale. As turpentine has been rather expensive of late, it would appear that some ingenious individual has improved this process, at the same time increasing the profits, by simply substituting Kerosene for the turpentine, and proceeding "*Secundum Artem*."—*Proc. of Amer. Pharm. Assn.*, 1865.

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#### ELIXIR OF VALERIANATE OF AMMONIA.

By J. FARIS MOORE.

Mr. Joseph Roberts, of Baltimore, having failed to reply to the Query, the following formula is presented as a simple mode of preparing the elixir, which has given satisfaction, and has been adopted by the Maryland College of Pharmacy.

Take of Valerianic acid, one fluidounce ;

Distilled water, twenty-four fluidounces ;

Carbonate of Ammonia, a sufficient quantity ;

Inodorous Alcohol, twelve fluidounces ;

Simple Syrup, twelve fluidounces ;

Peach water, eight fluidounces ;

Saturated tinct. of Red Saunders, four fluidrachms ;

Saturated tinct. of recent Orange Peel, one fluidounce ;

Oil of Bitter Almonds, five minims ;

Oil of Sweet Orange, twenty minims ;

Caramel, a sufficient quantity.



Mix the valerianic acid and the distilled water, and add a sufficient quantity of carbonate of ammonia to saturate the acid; then add the other ingredients, with a sufficient quantity of caramel to impart a brownish shade to the mixture, and filter through paper.—*Proc. Am. Pharm. Assoc.*, 1865.

## ON THE PRESERVATION AND DISPENSING OF OINTMENTS AND CERATES.

BY WILLIAM SILVER THOMPSON.

“What are the best vessels in which to dispense ointments and cerates, combining fitness with elegance and accuracy?”

The vessels in most common use for dispensing ointments and cerates, are the common jar and gallipot of earthenware; being convenient and readily obtained, they answer the purpose when the ointment is intended for immediate use only, but the great objection to the material of which these vessels are composed is its porous nature, the glazing not being perfect enough to prevent the absorption of the fatty matter into the body of the jar.

The common turned wood box answers a good purpose for dispensing the ordinary ointments and cerates, and on the score of economy will no doubt continue to be used unless superseded by something quite as cheap, and less objectionable. The difficulty often experienced in pasting the label on the turned box, owing to the porous nature of the wood, is entirely obviated by the application of two or three coats of acetous mucilage or liquid glue, by means of which the pores of the wood are filled and a smooth surface is prepared for the label.

The best vessels in which to dispense ointments and cerates, combining all the requisites of fitness, elegance and accuracy, are undoubtedly of glass. For ointments of very soft consistence, nearly approaching the nature of liniments, a wide mouth vial, fitted with a good cork stopper, answers a good purpose. For ointments of firm consistence and cerates, the flat jar of glass, with accurately fitting cover, made by the New England Glass Company, and probably by other factories, answers every requirement, where the expense of such a vessel is not an objection; and it would probably be brought into general use, if it could be furnished by the manufacturers at a lower price.

Since accepting this query, I have induced one of our glass dealers to introduce a style of jar with tinned iron cover, (a sample of which is now presented,) which answers a good purpose, although objectionable on account of the imperfect manner in which the mouth is finished. This jar, of the size presented, can be furnished to the trade at about seven or eight dollars per gross.

“What is the best plan for keeping ointments and cerates in the dispensing shop, so as to retard their tendency to oxidation?”

To make an ointment that will keep, it is of primary importance that the materials used should be of good quality, especially lard. This article is sometimes adulterated by an admixture of water, which answers the double purpose of rendering the lard white and increasing its weight. The amount of water introduced varies in proportion, according to the conscience of the operator. This variety of lard should be carefully avoided by the Pharmaceutist, as the ointments and cerates into which it enters undergo oxidation rapidly, and soon acquire a degree of rancidity which is offensive to persons in health, and of course much more so to the sick. What is called leaf lard, prepared at farm houses, and which is used by some Pharmaceutists, is undoubtedly the best for preparing ointments; but when this cannot be procured, the article known in commerce as pressed lard, answers a good purpose; being prepared from firm lard in the first instance, it is not liable to the objection of containing water.

Another advantage gained in the use of pressed lard for many ointments is, that the quantity of wax may be considerably reduced, which, on the score of economy, is of some importance; and as wax is used merely to give consistence to the ointment, it is a question whether an ointment prepared from pressed lard is not superior to one into which a large proportion of wax enters, on the ground of being more homogeneous.

The use of benzoin in the preparation of ointments and cerates undoubtedly tends to retard oxidation. It is best used in the form of tincture made in the proportion of four ounces to the pint of alcohol, two fluid drachms of which are sufficient for sixteen ounces of ointment.

Having volunteered the foregoing remarks in regard to the

preparation of ointments, it remains to answer the query as to the best plan of keeping them so as to retard the tendency to oxidation.

It is important that the dispensing jars for ointments should be of material impervious to fats. Jars of French or German porcelain answer this end, and ointments kept in them will resist oxidation for a much longer time than when kept in the ordinary Liverpool or earthenware, which is of a porous and absorbent nature. Whenever the least tendency to oxidation manifests itself, the jar should be thoroughly cleansed by means of strong soap and water, or a diluted solution of potassa or soda.

The position selected for the jars in the shop, should be one in which the extremes of ordinary temperature are avoided, such as a dark closet against a brick wall; near the floor and remote from the stove or heating arrangement. If the cellar is convenient of access, it is preferable for summer use.

By attending to the foregoing precautions, the Pharmaceutist will have little or no trouble with his ointments and cerates, and will never have to suffer the mortification of being reminded by a customer that he had dispensed a rancid preparation; such, at least, has been my experience in a practice of many years.

*Baltimore, June, 1865.*

*Proc. Am. Pharm. Assoc., 1865.*

## ON THE GROWTH AND PREPARATION OF RHUBARB IN CHINA.

BY FRED. J. FARRE, M. D. CANTAB.

To the Editor of the Pharmaceutical Journal:

Sir,—It has often occurred to me that, while frequent attempts have been made, by personal inquiry and research, to discover the source and exact localities of the Chinese rhubarb plant, which have only resulted in deception and disappointment, we have in great measure neglected to avail ourselves of the more reliable information contained in Chinese books and manuscripts intended for the use and instruction of the Chinese themselves. An opportunity of obtaining such information was recently afforded me by Mr. Lockhart, who kindly supplied me with

some valuable Chinese books, from which I extracted the facts which I have recorded at page 269 of Pereira's "Manual of Materia Medica." This information respecting the various localities of the rhubarb plant was sufficiently interesting to induce me to make further inquiries through the same channel. Mr. Lockhart undertook to convey my wishes to China, and if possible to obtain either the leaf, flower, or fruit of the plant itself. He failed to obtain these, as, like others, he had often tried and failed before; but he procured from the Rev. Griffith John, a missionary residing at Hankow, the following extracts from the "Pun-tsau," or Chinese Herbal, which, as well as the "Pieh-luh," which it quotes, is a work of good authority. Wu-pu, Tau-hung-king, Kung, Su-sung, and Sung-ki are Chinese writers. I am indebted to Mr. John for the translation. The notes are added by Mr. Lockhart.

I give the extracts from the "Pun-tsau" exactly as I received them, that they may be available to others as well as myself; but to make them more intelligible I have subsequently rearranged and condensed them, and have finally drawn from them a few conclusions.

*Extract from the "Pun-tsau."*

1. In the "*Pieh-luh*" it is stated that rhubarb grows in valleys west of the Yellow River, and in the district of Lung-si, in the province of Shen-si. The root is extracted in the second and the eighth months, and dried by means of artificial heat.

2. *Wu-pu* says: As to the rhubarb which grows in Si-chwan (Sz-chuen), and probably Lung-si, in the second month\* its closed leaves are of a deep yellowish color, and its stalk is more than 3 feet (Chinese†) high. In the third month the flower is yellow; in the fifth month the seed is black; and in the eighth month the root is extracted. The root, which contains a yellowish sap, is cut up in slices, and dried in the shade (*i. e.* without either sun or artificial heat.)

3. *Tau-hung-king* says that the Si-chwan rhubarb is not equal in quality to that of Lung-si in Shen-si; that it is very bitter in

\* The Chinese months are lunar, the first beginning in February or March.—L.

† The Chinese foot is about 13 inches. It varies from 12½ to 14.—L.

taste, and extremely black in color; that that which is dried in the shade in the west of Si-chwan is superior to that which is dried in the sun in the north of the same province; and that that which is dried by means of artificial heat is slightly charred, and not equal to the rhubarb in the west of the province in resisting the woodworm.

4. *Kung* says that the leaf and stalk of the rhubarb resemble those of the Yang-ti plant. Its stalk, which grows to the height of 6 or 7 feet, is crisp and sour, and may be chewed raw. The leaf is coarse, long, and thick; the root is red, and resembles that of the Yang-ti plant; its shape is like a basin, and it is about 2 feet long; its nature is soft and moist, and it is easily destroyed by the woodworm. That which is dried by means of artificial heat is best. It is dried thus:—A stone is heated, and on it are placed the roots cut in horizontal slices about an inch thick. Being thus heated for a day, they become a little dry. A hole is then made in each piece, through which they are strung together like *cash*.\* The root thus cut and partially dried is then hung up in the shade till it becomes perfectly dry and fit for market. The rhubarb which grows in Shen-si, Kan-suh, and in the west of Si-chwan, is all of good quality. That which grows in Shan-si, Chil-li, and other places to the north of these, is smaller in size, and not equal to that of Si-chwan in point of strength. What *Tau-hung-king* says about the Si-chwan rhubarb being inferior to that of Lung-si is a mistake.

5. *Su-sung* says, that rhubarb grows everywhere in Si-chwan, east of the Yellow river, and in Shen-si. The Si-chwan rhubarb is fine-grained. Next comes that of Shen-si. The plant of the latter produces green leaves in the first month, which resemble those of the Pima (*Ricinus Communis*, Linn.), and are as large as a fan. The root resembles a Chinese potato,† the largest being the size of a basin, and from one to two feet long. In the fourth month a yellow flower opens; in the second and eighth months the root is extracted, and the black skin which covers it

\* *Cash* is a foreign name for Chinese copper coins, called *tung-tseen*, with a square hole in the centre.—L.

† The Chinese potato is the *Dioscorea Batatas*, or white Yam, a long cylindrical root which has been recently introduced into England.—L.

being taken off, it is cut in horizontal slices, and dried by means of artificial heat. The Si-chwan rhubarb is cut perpendicularly, which makes the slices resemble the tongue of an ox, and, hence it is called the ox-tongue rhubarb.\* The uses and value of these two kinds of rhubarb is the same. Hwai-ngan-fu, in the province of Kiang-su, produces what is called Tu-ta-kwang, local rhubarb.† The flower opens in the second month.

*Sung-ki*, who prepared some diagrams illustrative of the productions of Yih-chau, in Si-chwan, says that the rhubarb plant grows everywhere among the high mountains of Si-chwan. Its stalk is red; the leaf is large; and the root is so large that it is used for a pillow in the medicine markets. He also states that the Lung-si rhubarb, in Shen-si, was considered best in his time. He lived in the Sung dynasty, between 1000 A. D. and 1270 A. D.

It seems that the Yang-ti plant has been mistaken by some for the rhubarb on account of its resemblance to it. Li-shi-chen affirms that it is quite a distinct species.

The foregoing account, as Mr. John observes in a letter to Mr. Lockhart, is far from satisfactory. The information is meagre and somewhat contradictory; nevertheless, it appears to me to add something to our former knowledge, and to throw a little light on the species, as it certainly does on the localities of the rhubarb plant. It is probably by collecting and comparing such information that we shall ultimately get at the truth. Avoiding repetitions, the above-mentioned statements may be arranged as follows:—

*Localities.*—The rhubarb plant grows in the provinces of Shan-si and Shen-si, which are situated respectively east and west of the Yellow river, in the upper part of its course, before it turns eastward towards the Yellow sea. Lung-si, in the province of Shen-si, is one of its best localities. It also grows in Chil-li and other places further north, in Kan-suh, which borders

\* I believe what is intended is a thin diagonal slice, common in the shops, and which I used to buy. It might, by a lively imagination, be likened to an ox tongue. The others are transverse slices.—L.

† The best rhubarb is Sz-chuen. The others, and especially that of Kiang-su, are called *local*, which implies inferiority.—L.

on Mongolia, north of the lake Koko-nor, and in the Nan-chan mountains, and everywhere among the high mountains of the province of Sz-chuen (or Si-chwan), which lies to the east of Thibet, and 3—400 miles north-east of the northern extremity of Birmah.

*Description of the Plant.*—The root resembles that of the Chinese potato, or white yam (*Dioscorea Batatas*). It is from one to two feet long, and thick enough to be used as a pillow. It is covered with a black skin, is soft and moist, and contains a yellowish sap. The plant puts forth its leaves in the first or second month. The unexpanded leaves of the Sz-chuen plant in the second month, are of a deep yellowish color; those of the Shen-si plant, in the first month, are green, as large as a fan, and resemble those of the Pima (*Ricinus communis*, Linn.) Kung describes the rhubarb leaf as coarse, long, and thick. In Sz-chuen, the stem is more than 3 feet high in the second month. According to Kung, who does not mention the locality, the stem attains the height of 6 or 7 feet, and is red, crisp, sour, and eatable in its raw state. In the third or fourth month it opens its yellow flowers, which are succeeded in the fifth month by a black seed (nut). The root, leaf and stalk of rhubarb, according to Kung, resemble those of the Yang-ti plant. This writer says that the root is red, but, in other respects, his description of it accords with that of the other writers.

*Preparation and Drying of the Root.*—The root is taken up in the second or eighth month, and the black skin which covers it is removed. It is then cut in slices, either longitudinally, as in Sz-chuen, or transversely, as in Shen-si and elsewhere, and dried in the shade with or without artificial heat. The following mode of drying is said to be the best:—a stone is heated, and the roots, cut in traverse slices about an inch thick, are placed upon it. By this means the pieces are partly dried. A hole is then made in each, and the pieces are strung on a cord, and suspended in the shade until they are perfectly dry and fit for the market.

*Quality.*—The rhubarb (*hwang*) which grows in Shen-si, Kan-suh, and in the west of Sz-chuen, is all of good quality. That which grows in Shan-si, Chil-li, and other places to the north of these, is smaller, and not equal in strength to that of Sz-chuen.

In Sz-chuen, however, the quality appears to vary, that which grows in the west and is dried in the shade being better than that which is dried in the sun in the north of the same province; while that which is dried by artificial heat is said to be slightly charred. Tau-hung-king, who makes the foregoing remark, adds that Sz-chuen rhubarb is not equal in quality to that of Lung-si in Shen-si; that it is black in color and very bitter. This, however, is altogether denied by Kung. Su-sung also says that Sz-chuen rhubarb is fine-grained, and next comes that of Shen-si. He adds, however, that the value of these two kinds is the same. Sung-ki, who lived between A. D. 1000 and 1270, says that in his time Lung-si (Shen-si) rhubarb was considered the best.

Notwithstanding the want of precision and agreement in the above statements, I think that, taken in connection with the extracts from "The Rules of the Drug Trade in China" and from "The Chinese Commercial Guide," they will warrant the following—

#### *Conclusions.*

1. Rhubarb grows in many parts of the Chinese empire, but chiefly in Kan-suh, south of Mongolia, about Ko-ko-nor, and on the Kawn-lun mountains, which forms the northern boundary of Thibet; and also in the provinces of Shen-si, Shan-si, Ho-nan, and Sz-cheun. From the former districts the dried root reaches Europe at present by way of Moscow; from the latter it is conveyed along the Yellow and Yang-tse rivers to the ports of Shanghai and Hankow.

2. The descriptions of the plant are not sufficiently precise to show whether the roots of only one, or of more than one species are collected for medicinal use. Any real differences in the descriptions are easily accounted for on the latter supposition. The contradictions, however, are more apparent than real. According to Kung the root is *red*, while Su-sung says that it is covered with a *black skin*, which is taken off. The black skin consists, as any one may see by examining the root of *Rheum palmatum* in the winter, of the black decayed bases of the sheathing petioles, which cover the rhizome, so that its red color is not apparent until these are removed. The difference in the height of the plant and the color of the leaves probably depends



on age or locality. The most important feature in the description is the statement of Su-sung, that the leaves of the Shen-si rhubarb plant resemble those of *Ricinus communis*, the only known species of *Rheum* whose leaves admit of this comparison being *R. palmatum*. Su-sung particularizes the leaves of the Shen-si rhubarb, as if this was different from the Sz-chuen plant. Possibly he was only acquainted with the Shen-si plant, and therefore spoke cautiously. There appears, however, to be another species of rhubarb, which Kung calls the Yang-ti plant. This is said to be often mistaken for the ordinary rhubarb plant, on account of its resemblance to it; but Li-shi-chen affirms that it is a distinct species. It is, probably, also a species of *Rheum*, whose root, though known in the market as Yang-ti rhubarb, is smaller and of inferior quality, and therefore not called rhubarb by first-class dealers. Yang-ti rhubarb means sheep's-foot rhubarb, and is so called from a fancied resemblance to the feet of the sheep, as the Sz-chuen rhubarb is called, doubtless also from its shape and size, hoof or horse-hoof rhubarb. The Tutta-kwang or local, *i. e.* inferior rhubarb mentioned by Su-sung, which flowers two months earlier than the palmate-leaved rhubarb of Shen-si, may be a third species. There are a few characters which do not correspond with *R. palmatum*, or indeed with any of our cultivated species. The resemblance of the root to a basin is far from obvious, and the so-called seed or nut is usually a rust-brown rather than black. The objection to *R. palmatum* being the source, or a source, of the officinal rhubarb has, I believe, been chiefly founded on the statement of Pallas, that these species appeared to be quite unknown to the Buchar-ians, and that their description corresponded most nearly with *R. compactum*, the seeds of which were sent to Miller from St. Petersburg as the true *Tartarian* rhubarb. But still less has hitherto been known of the rhubarb which grows in *China* itself; and I think I have now shown equally good reason for believing that the best kind of Chinese rhubarb—namely, the produce of Shen-si, and probably also of Sz-chuen—is *R. palmatum*, which, notwithstanding all that has been said against it, has always been considered to approach most nearly to Asiatic rhubarb. Kung, who does not mention any locality, but compares the

rhubarb to the Yang-ti plant, says that the stalk is crisp and sour and may be chewed raw. *Rheum palmatum* is not cultivated in England for culinary use; but Mr. Robinson, of the Botanic Gardens, Regent's Park, informs me that he has seen it so used in Ireland.—*Lond. Pharm. Jour.*, Jan. 1st., 1866.

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## ON THE FORMATION OF GLUCOSE BY LEAVES.

BY M. BOUSSINGAULT.

The supposition that the production of glucose and its congeners is principally effected by the aerial organs of plants is contradicted by the abundance of saccharine matter in the stalks, the roots, and especially by the formation of the same matter during germination, when the leaves are not yet formed. But the germination only transforms starch into glucose, sugar and cellulose; it brings no combustible element; on the contrary, the embryo, for its nourishment, consumes those pre-existent in the seed.

By looking at the vegetable world in its entirety, one is convinced that the leaf is the first resting-place of the glucosides, which, more or less modified, are found scattered in various parts of the organism; that it is the leaf which elaborates them, at the expense of the carbonic acid and water. In maize, wheat, &c., the accumulation of saccharine principles takes place in the stalk, up to the time of flowering, when all that has been formed assists in the formation of the seed. In beet root, this receptacle is the principal fleshy root. But where there is neither stalk nor root, where is the saccharine matter formed by the leaf deposited? In the leaf itself, which is then considerably extended. The most striking example is presented by the American agave, the maquey, the vine of the Mexicans, the culture of which extends from the time of Montezuma and further. The leaves of the agave all grow from the neck of the root; they attain two metres in length, twenty centimetres in breadth, and one decimetre at the point of attachment. During from fifteen to twenty years, these leaves elaborate and accumulate glucose, until the stalk which is to bear the flowers and fruits begins to form. Then the large, coriaceous, prickledged

leaves, after having remained so long inclined to the ground, raise themselves and approach the conical bud, as if to cover and protect it. Then there is a very apparent and gradual movement, seeming to obey a will. The bud lengthens with surprising rapidity, and a flower-stalk, five or six metres in length, is soon formed. The work of reproducing the seed is thus accomplished, and it is by preventing this, that the Indians procure an ample harvest of the sweet sap, by fermenting which, they prepare pulqué, their favorite intoxicating drink. One agave plant, in the environs of Cholula, yields in four or five months nearly one cubic metre of sweet liquid, after which it dies exhausted, as it would also die exhausted, were the stalk allowed to develop and bear flowers and fruit. An agave yields in four months about 100 kilogrammes of glucose, prepared and preserved by its leaves for years.\*

There is no doubt as to the origin of this glucose; it proceeds from the carbonic acid and water decomposed by the leaves.

To conclude, I trust my experiments will enable me to dispute the direct formation of saccharine matter by the green parts of vegetables exposed to the sun.—*Lond. Chem. News*, Dec. 22, 1865, from *Comptes Rendus*, lxi., 664.

## ON THE PHYSIOLOGICAL EXHAUSTION AND THE VITALITY OF BEER YEAST.

By M. A. BECHAMP.

The life of the leaven being contained in the cellule, I supposed that, so long as this cellule was neither destroyed nor dead, the leaven would continue to live, and to manifest this life by its characteristic chemical actions, but in certain cases, such as those about to be described, like an animal in a state of inanition—that is to say, in exhausting itself.

To measure the physiological exhaustion of beer yeast, I estimated the phosphoric acid it eliminates while consuming its own tissues, when forced to live in distilled water.

Mitscherlich analyzed beer yeast, and from his analysis con-

† See Boussingault "Sur le Pulqué:" report made to the Imperial Commission for Mexico.

cluded that 100 grammes of dry yeast contained the elements of 4.28 gr. of anhydrous phosphoric acid. But this analysis does not prove that the acid was actually formed there.

The infusion of yeast is, no doubt, always acid, and this acidity may be attributed to phosphoric acid, if the yeast does not ceaselessly engender other acids. To ascertain that the yeast actually contained pre-formed phosphoric acid, and phosphates, boil the well-washed yeast in a large quantity of distilled water; this will kill it, and cause it to abandon various products, and among them phosphoric acid, which estimate by the process presently to be described, whence it will be found that 100 grammes of dry yeast disengages from 2.8 gr. to 3.1 gr. of phosphoric acid, of which a portion is free.

But though the yeast abandons large quantities of phosphoric acid, at a temperature of  $100^{\circ}$ , when it is killed, this is not the case when it is left in water, either cold or even heated to  $30$  or  $40^{\circ}$ ; under these circumstances it abandons the phosphoric acid and other matters very gradually, not as an inert precipitate, but as a living creature, offering vital resistance to destruction. By renewing the water every twenty-four hours, and estimating the phosphoric acid in each lixivium, it will be found that the quantity of this acid, small at first, augments with each successive treatment, and rapidly attains a maximum, after which it decreases, until it altogether disappears. The following is the experiment:

In the first place I determined the amount of phosphoric acid which could be found in matters adhering to the yeast, proceeding from the medium in which the yeast was formed, or which had been excreted by the yeast itself and impregnated it externally. 500 grammes of brewers' yeast, new and in a paste, were soaked in cold water and washed on a filter. The yeast having been well drained, there remained four litres of lixivium. In this liquid the phosphoric acid was estimated by the same process which was applied to the following estimations; and there were obtained of anhydrous phosphoric acid, 0.095. gr.

This result is invariable; all things being equal, 500 grammes of yeast in a paste, representing about 100 grammes of dry

yeast, yield to cold water less than 1 decigramme of phosphoric acid.

280 grammes of this same washed yeast, containing 48.2 gr. of yeast dried at  $100^{\circ}$ , were introduced into a special apparatus with 1600 cubic centimetres of water boiled and then cooled to  $40^{\circ}$  in a current of carbonic acid. To make perfectly sure that no foreign bodies were formed, a few drops of creosote were added to the water intended for washing. Every twenty-four hours the water was decanted and renewed by a fresh supply, under the same conditions. All these washings were screened from the air in an atmosphere of carbonic acid, the apparatus being in a warm place, the temperature of which could vary from  $20$  to  $30^{\circ}$ .

These washings furnished the following results :—

	gr.
1st washing—anhydrous phosphoric acid.	0.056
2d     "             "             "	0.073
3d     "             "             "	0.074
4th    "             "             "	0.076
5th    "             "             "	0.346
6th    "             "             "	0.444
7th    "             "             "	0.371
8th    "             "             "	0.190

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Total of phosphoric acid . 1.630

These numbers appear significant. Were beer yeast merely an inert precipitate, were phosphoric acid present in the mass, as mother liquor is in the precipitate, the washings would eliminate the greater part of the soluble matters in the first operations, and the quantity of these matters would diminish more and more. But we see here that the yeast at first resists, then suddenly its resistance diminishes, and it yields a large quantity of its disassimilated materials. This is ascertained by the weight of phosphoric acid eliminated, which suddenly increases to five or six times its previous weight; after which it naturally decreases. By adding the amount of the different estimations at  $100^{\circ}$  of the phosphoric acid in dry yeast, the number will be found to be 3.38. The weight of phosphoric acid eliminated is then greater by three-

fourths than that produced by the incineration of the yeast, as in Mitscherlich's process; and if it is observed that the yeast eliminates at the same time various other products, proportionately to the quantity of phosphoric acid, an idea may be formed of the degree of exhaustion undergone by each globule. The exhaustion is such that under the microscope the yeast seems reduced to merely its envelope; it is then barely visible, and its color so faint that it looks like shrivelled skins, with no clear outlines, and with a taste like raspberries. From the nuclei or interior granulations which remain, the form of the envelope may be divined.

If by the use of the apparatus, elsewhere to be described, the air is perfectly excluded, this exhaustion can be effected, without what is called the putrefaction of the yeast, or, more correctly, without the appearance of the organisms which cause the putrefaction of the organic matters eliminated. But if air enters, these products acquire a foetid odor, and there may be observed a disengagement of sulphuretted hydrogen, and the formation of the infusoria, which are the cause of a particular fermentation of the nitrogenized and sulphuretted organic matters of yeast. However, if the other products accompanying phosphoric acid are different, the quantity of the latter in each washing corresponds to the numbers of the above table.

The yeast exhausted in the experiment which furnished the numbers given in the table appeared to be dead; but this was not the case, for it was still capable of transforming cane sugar into glucose—that is to say, of forming zymase and then producing alcohol by the glucose engendered. But the products of alcoholic fermentation by exhausted yeast are notably different in nature and in quantity from those obtained from normal yeast. The same as in alcoholic fermentation by mother of vinegar, a crystallizable compound is formed possessing the properties of mannite.

These results prove contrary to Mitscherlich, (who supposed that the globules of ferment, well washed in water are entirely deprived of the property of saccharifying cane sugar), that yeast continues to change cane sugar until it ceases to live, and that when it is so much exhausted that it may be said to be reduced

to its cellule, it nevertheless continues to form successively glucose and alcohol with cane sugar. The property of determining alcoholic fermentation must not, then, be attributed to the catalytic action of some chemical compound which it contains; my researches seem to prove that it is contained in the properties of the living cellule; it is a consequence of the act of nutrition of this cellule.\*—*Lond. Chem. News*, Dec. 8, 1865, from *Comptes Rendus*, lxi., 689.

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#### THE CALCUTTA BOTANICAL GARDENS.

Dr. Anderson's official report of the damages caused to the Calcutta Botanical Gardens by the cyclone of the fifth of October, 1864, has only just now been published, owing to the mass of detail it was necessary to collect. The document may be called a cry of despair. The gale was more violent at the garden than at Calcutta itself, owing to the place being nearer the centre of the cyclone, and more exposed to the full force of it. Few trees fell before 11 o'clock A. M., and none after 4.30 P. M., yet within this short space of time a paradise was converted into a wilderness. The great baobab-tree of Africa was uprooted, and came down with a crash that caused vibrations in the earth felt at a distance of some hundred yards. Three gigantic specimens of iron-wood, the oldest in the garden, none less than 150 feet high, were levelled to the ground. Many of the most picturesque parts of the garden, resulting from the grouping of trees, no longer exist. Of the whole fine teak avenue leading to Kyd's monument only two mutilated trees

\* These conclusions are opposed to M. Liebig's assertion (*Traité de Chimie Organique*, introduction p. 27):—"The insoluble body called 'ferment' does not provoke fermentation." The proof he gives of this is, that the yeast washed with water, deprived of air, leaves a residue which has lost the power of fermenting cane sugar. This has caused it erroneously to be supposed that the phenomenon, being much less decided, had ceased to exist at all. On the other hand much less attention is given to the previous inversion of the cane sugar, and it is well known (notwithstanding an important and probably unknown experiment of M. Dubrunfant) that M. Pasteur has admitted that sugar cane ferments directly, the formation of changed cane sugar being consecutive to the formation of succinic acid.

remain. Of the splendid grove of mahogany-trees, some of which were planted in 1796, thirty-one specimens are blown down. The iron-wood avenue, planted by Dr. Wallich, has suffered severely. The water, breaking through the river embankment, and flooding the grounds, helped to complete the ruin. The scene presented the morning after the cyclone outdoes description. More than one thousand trees, and innumerable shrubs, lay prostrate. Nothing had been spared. Trees that had not fallen were more or less stripped of their branches. Not a vestige of a leaf, flower, or fruit remained; the lawn, roads and tanks were blocked up by trees and fallen branches, and hundreds of cart-loads of straw had been carried by the water into the grounds. More than seventy years will be required to restore the garden to the splendor in which it was on the night previous to the cyclone. The most singular part about this devastation is, that of the two great classes of plants into which the vegetable kingdom is divided, the endogens suffered the least injury. This produced a striking effect on the scenery. All the exogens being laid low, the country about Calcutta appeared to be covered with only four kinds of trees, the bamboo the cocoa-nut, the wild date, and the Palmyra.—*London Pharm. Jour.*, Jan. 1st, 1866, from *Athenæum*.

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### ON CAMPHOR WATER.

By G. F. H. MARKOE.

“Which process for Camphor Water is to be preferred, that of the U. S. Pharmacopœia or of the British Pharmacopœia?”

The United States Pharmacopœia directs Camphor Water to be made thus:

Rub 120 grains of Camphor with 40 minims of Alcohol, then with 240 grains of Carbonate of Magnesia, then with two pints of water gradually added, and lastly filter through paper.

Two pints of Camphor Water were carefully prepared in strict accordance with the above formula, and the magma of carbonate of magnesia and camphor remaining on the filter was transferred to a small beaker and treated with dilute sulphuric acid in very slight excess, by which means the magnesia was



dissolved as sulphate, and the camphor separated by the process was collected on a small filter, washed with camphor water to remove adhering sulphate of magnesia, then dried by pressure between folds of bibulous paper.

The camphor is now in the form of a dirty gray cake, being in fact very "crude". To purify it we dissolve it in a small portion of chloroform, and throw the solution into a small funnel, the neck of which is stopped with a bit of cotton, and finally the camphor obtained by the spontaneous evaporation of the chloroformic solution is carefully weighed, and the amount obtained deducted from the 120 grains of camphor used in the first instance.

Six experiments were made at various times with the following results :

- |    |          |               |         |                          |
|----|----------|---------------|---------|--------------------------|
| 1. | 120 grs. | camphor used, | 55 grs. | obtained from the magma. |
| 2. | 120 grs. | "             | "       | 59 grs. " " "            |
| 3. | 120 grs. | "             | "       | 54 grs. " " "            |
| 4. | 120 grs. | "             | "       | 56 grs. " " "            |
| 5. | 120 grs. | "             | "       | 57 grs. " " "            |
| 6. | 120 grs. | "             | "       | 55 grs. " " "            |

The average amount by these experiments being fifty-six (56) grains, from the 120 grains used each time.

Deducting 56 grains from 120 grains gives us sixty-four (64) grains, which must be the amount of camphor held in solution by two pints of the Camphor Water of the U. S. Pharmacopœia, being in the proportion of two (2) grains to the fluidounce.

The British Pharmacopœia orders

Camphor broken in pieces, half an ounce, (avoirdupois) (219 grains troy, within a fraction.)

Distilled water one gallon (imperial measure.)

Enclose the camphor in a muslin bag, and attach this to the stopper of a jar containing the distilled water. Invert the jar, allow it to stand at least two days, and pour off the solution when required.

One imperial gallon of Camphor Water was made by the British process, and after standing three days the undissolved camphor dried carefully between folds of filtering paper and carefully weighed.

219 grains troy were used, of which (137) one hundred and thirty-seven grains remained undissolved, the difference, (82) eighty two grains, representing the amount of camphor in solution in one imperial gallon of the British preparation, or about half a grain to the fluidounce, or one grain of camphor to 936 grains or minims of water; being quite near the statement made by Berzelius, that one part of camphor is taken up by 1000 parts of water by rubbing them together.

The statement contained in the U. S. Dispensatory, given on the authority of Wm. Hodgson, Jr., that "our own officinal preparation, when properly made, contains about 50 grains to the pint, or more than 3 grains to the fluidounce," is incorrect; it only holds in solution thirty-two (32) grains of camphor in each pint, or two (2) grains in each fluidounce.

The United States Pharmacopœia Camphor Water contains two grains of Camphor to the fluidounce.

The British preparation contains about half ( $\frac{1}{2}$ ) a grain of Camphor in each fluidounce.

The U. S. P. preparation is thus proved to be four times the strength of the British preparation.—*Proc. of the Amer. Pharm. Assoc.*, 1865.

*Boston, September, 1865.*

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#### ESSENCE OF COGNAC AND OF WINE.

This is a mixture of several ethers of the ethylic series, but of which the special odor is that of pelargonic ether. The essences may be prepared in two ways: the first gives nearly pure pelargonic ether; the other, mixtures of very variable composition, and apparently inferior in quality. By the first method, pelargonic acid is obtained by treating oil of rue by nitric acid; to etherize pelargonic acid, dissolve it in concentrated alcohol, and pass into the mixture a current of dry hydrochloric acid; the pelargonic ether rises to the surface as it forms. By the second method, a fatty body is treated by nitric acid, and fixed fatty acids are produced, such as adipic, pimelic, lauric, succinic, &c., and also volatile acids, which may be distilled, and of which the chief are butyric, valerianic, capric,

caproïc, caprylic, cœnanthylic, and pelargonic. This is the mixture which is to be etherized. Alcohol is sometimes scented with the product obtained by etherizing cocinic acid, extracted from cocoa-nut oil; to obtain this acid, saponify cocoa-nut oil by potash, decompose the soap by hydrochloric acid, dissolve the acid thus obtained in alcohol, and pass into it a current of dry hydrochloric acid; a yellowish liquid will be the result; wash it with water and with alkaline water, when pure cocinic ether will remain, which mix with ten times its volume of alcohol. The richness of commercial essences in pure essences may be ascertained by distillation; alcohol boils between  $80^{\circ}$  and  $85^{\circ}$ , and the essence remains as a residue. Artificial essences are not generally used in perfumery, excepting essence of mirbane; but other agreeably-scented essences will very probably be some day used, carefully combined and considerably diluted. As found in commerce, they have an odor which is far from agreeable, and they, moreover, have an injurious effect on the animal economy when inhaled in sufficient quantity; they must then, if used, be used sparingly.—*Chem. News. Dec. 22, 1865, Des Odeurs; des Parfums, et des Cosmétiques.*

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## ON THE MANUFACTURE OF CITRIC ACID.

BY FREDERICK ROW, F. C. S.

As so little attention has hitherto been given to the manufacture of these organic acids by scientific men (probably on account of the small quantity annually produced), a few observations from practical experience may not be uninteresting.

The first point of importance in this manufacture is the defecation of the lime or lemon-juice imported, and from which almost all the citric acid of commerce is produced.

This juice contains, besides the citric acid, a large quantity of coloring matter, mucilage, and other impurities, which in the ordinary method of working so contaminates the citrate of lime next produced as to render the subsequent solution, and also the crystals of citric acid, so impure that repeated re-crystallization and re-saturation are necessary to render them fit for the market.

Hitherto it seems to have baffled the efforts of manufacturers to overcome this difficulty, and hence the great cost at which the acid is prepared; but the writer of this paper has found that, when the concentrated juice is diluted to the same strength as the fresh juice (which contains about twelve ounces of citric acid to the gallon) a great part of the mucilaginous and other impurities will separate by subsidence in a flocculent form, and the citrate of lime and also the citric acid produced from the juice so purified will be in a state of comparative purity.

Another very important point for consideration of the manufacturer is the way in which the solutions of these acids are evaporated; the sulphuric acid, necessary to be in slight excess at first, so accumulates in percentage by the repeated evaporation and crystallization of the citric acid out of the solutions, as to cause a most destructive action upon that remaining in the mother liquors. Various means have been used to prevent this, the most successful being doubtless the substitution of water for steam heat during evaporation, but as the lower temperature requires longer exposure to heat, the advantage thus gained is almost counteracted.

The most effectual means of remedying this is by passing the mother liquors, so soon as they are found to contain any dangerous amount of sulphuric acid, through a fresh portion of citrate of lime, which not only removes at once all free sulphuric acid contained, but there is also deposited a quantity of flocculent matter which was held in solution by it, and which is no doubt the cause of the mother liquors when old crystallizing only with such difficulty. The flocculent precipitate referred to consists for the most part of sulphate of lime, but contains also some phosphate of iron and alumina, and accumulates more or less according to the care bestowed in evaporating the solution, it being most insoluble when the liquor contains about 6 lbs. of citric acid to the gallon, marking 1200 to 1250 (according to temperature) on the hydrometer, and if not separated from the solutions at that point it partly dissolves again as they become more concentrated.

As a consequence of this, it is found necessary, in the usual working, to re-saturate these solutions as soon as they become surcharged with these matters and the sulphuric acid above re-

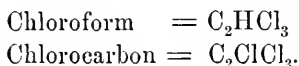
ferred to, and thus renew the whole process continually, which of course necessarily increase greatly the expense of working, as well as loss both in time and material; but when the process of purifying referred to is adopted, it is found practicable to work continuously with the same liquors without saturating, (of course depending upon the amount of carefulness in the manipulation), and in such case the cost of production is lessened nearly one-half. The crystals of citric acid also being most tenacious of sulphate of lime will often hold it so as to render them contaminated even to the second or third crystallization, producing an opacity, which when dried gives them an appearance of efflorescence, materially affecting their commercial value.

This difficulty, which is also, in the opinion of the writer, to be overcome, will form part of a future paper.—*Lond. Chem. News.*  
*Braintree, Jan. 13, 1866.*

#### A NEW ANÆSTHETIC.

Bichloride of carbon, the new anæsthetic, was first, I believe, discovered by M. Regnault, in 1839. It has already received various appellations from various chemists, as perchloroformene, perchlorinated chloride of methyl, bichloride of carbon, carbonic chloride, tetrachloride of carbon, superchloride of carbon, perchloruretted hydrochloric ether, and perchloruretted formene (see Gmelin's "Handbook of Chemistry," vol. vii, p. 355, and Watts' "Dictionary of Chemistry," vol. i., p. 765).

If it becomes, as I believe it will, for some medicinal purposes, an article of the *Materia Medica*, it will require to have a pharmaceutical name appended to it, and perhaps the designation of Perchloroformene, or the shorter term Chlorocarbon, may prove sufficiently distinctive. In its chemical constitution, bichloride of carbon, or chlorocarbon, is analogous to chloroform; with this difference, that the single atom of hydrogen existing in chloroform is replaced in chlorocarbon by an atom of chlorine, for the relative chemical constitution of these two bodies may be stated as follows:—



The chlorocarbon can be made from chloroform by action of chlorine upon that liquid, and Geuther has shown that the process may be also reversed, and chloroform produced from chlorocarbon, by treating it in an appropriate vessel with zinc and dilute sulphuric acid, and thus exposing it to the action of nascent hydrogen. The most common way hitherto adopted of forming bichloride of carbon consists in passing the vapor of bisulphide or bisulphuret of carbon, together with chlorine, through a red hot tube, either made of porcelain or containing within it fragments of porcelain. There result from this process chloride of sulphur and bichloride of carbon, the latter being easily separated from the former by the action of potash.

The bichloride of carbon or chlorocarbon is a transparent, colorless fluid, having an ethereal and sweetish odor, not unlike chloroform. Its specific gravity is great, being as high as 1.56, chloroform is 1.49. It boils at 170° F., the boiling point of chloroform being 141°. The density of this vapor is 5.33, that of chloroform being 4.2.—*Lond. Chem. News*, Jan. 26, 1866.—*Extracted from a paper by Dr. Simpson.*

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#### NEW PROCESS OF MAKING SODA.

Mr. A. G. Hunter, of Rockcliffe Hall, near Flint, has achieved a discovery which seems likely to lead to a most valuable modification in the process of making soda. It has long been known that caustic baryta will separate the sulphuric acid from a solution of sulphate of sodium, forming therewith an insoluble precipitate of sulphate of barium, and leaving caustic soda in solution. The decomposition of sulphate of sodium by caustic baryta is thus a far simpler and readier process than its decomposition by Leblanc's method; but caustic baryta has hitherto been, and is still, far too costly to permit of its use for the decomposition of sulphate of sodium on the great scale. Many attempts have been made to obtain it at a cheap rate from sulphate of barium, or "heavy spar," which is a sufficiently abundant natural product, but they have all been utter failures, and hence inventors have sought sedulously for some other and cheaper reagent, capable of acting, as regards sulphate of sodium, in the

same way. Mr. Hunter has found a very cheap one, indeed. He has discovered that lime, by far the cheapest of all alkaline bodies, will separate the sulphuric acid from sulphate of sodium in solution, provided that the solution, after the lime has been added to it, be subjected to a pressure considerably exceeding that of the atmosphere. He states that "either hydraulic, steam, or mechanical pressure," will answer equally well. Unless the application of the necessary pressure, on the large scale, should prove to be attended with greater difficulties than there seems any reason to anticipate, his discovery will revolutionize the soda manufacture; and by-and-by, all the carbonate of sodium produced will be obtained by the direct combination of caustic soda with carbonic acid, the caustic soda being obtained by a process embracing only two operations: (1) the decomposition of chloride of sodium, or common salt, by sulphuric acid, as in Leblanc's process; and (2) the decomposition of the resulting sulphate of sodium by lime.—*Am. Drug. Circ., Feb., 1866, from Mechanics' Magazine.*

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#### NEW PROCESSES FOR COVERING METALS WITH AN ADHERING AND BRILLIANT COATING OF OTHER METALS.

BY M. FRED. WEIL.

The author begins by observing that the galvano-plastic processes employed for depositing metals one on the other have the disadvantage of being expensive, and requiring apparatus expensive to keep in repair, and which, as is usually the case with cyanuretted baths, are unhealthy for the workmen.

The process proposed and employed by M. Weil, consists in the use of baths formed of metallic salts or oxides held in alkaline solution, (sodic or potassic,) and usually in presence of organic matters, such as tartaric acid, glycerin, albumen, or any other inoffensive substance which prevents the precipitation of the oxide by the fixed alkali. The deposit generally takes place at the ordinary temperature, but sometimes at a higher temperature. According to the author, his processes of the coppering and bronzing of iron, cast iron and steel, are of special importance; he can, moreover, vary at will the colors and tones, and

produce a series of results which it has hitherto been found impossible to produce, either directly or in a durable manner.

### COPPERING.

*Composition of the Coppering Solution.*—In ten litres of water dissolve,

Crystallized sulphate of copper . . .	350 grammes.
Crystallized sodio-potassic tartrate . .	1.500 “
Soda lime containing from 50 to 60 per cent. of free soda . . . . .	800 “

This solution, which always gives very satisfactory results, contains nearly two equivalents of tartaric acid to one of oxide of copper.

*Action of Various Metals on this Solution.*—Iron, cast iron and steel, as well as the metals whose oxides are insoluble in potash and soda, undergo no change when introduced into these baths. For coppering, the zinc or lead is plunged into the bath, care being taken that the iron, cast iron or steel articles should not touch each other, but that one of them should be in contact with the zinc. The copper was thus deposited upon, and strongly adhered to the iron.

The coating of copper increased within certain limits with the duration of the immersion. The author feels bound to admit that galvanic action alone will not effect the coppering of iron, cast iron and steel, under the foregoing conditions.

In fact, the metals whose oxides are insoluble in potash or soda, and form only one basic oxide, become covered in the baths with but a pellicle of copper, the thickness of which does not increase with the length of time of immersion.

Pure tin introduced into the cold solution does not become coppered; by contact with zinc it oxidizes; the protoxide of tin there formed reduces the copper solution, and protoxide of red copper is precipitated. The liquid holds no copper in solution after an excess of tin has been for some time immersed in it.

*Process of coppering.*—The iron, cast iron, or steel articles are thoroughly cleansed by acidulated water;\* they are then washed

\* The water acidulated with sulphuric acid to 2° B. The action should be continued from five to twenty minutes.



in plain water, and finally in water made alkaline with soda; then cleaned with a scratchbrush, again washed, and plunged into the copper bath in contact with zinc.

The articles are suspended in the copper bath by means of zinc wire; they should be immersed from three to seventy-two hours, according to the color, quality and thickness of the copper coating to be deposited. A tap is then turned in the lower part of the apparatus, the cuprous liquor drawn off, and the coppered articles washed in water. They are then taken out, cleaned with a scratchbrush, and dried, first in sawdust, then in a stove.

It is much more economical to use zinc wire than zinc plates.

To keep the bath of one strength while operating on a large scale, the author, by the advice of M. Dumàs, arranges his apparatus in a particular way, so that the liquid is renewed from below, and flows away drop by drop, or in a fine stream from the upper part, the level being kept constant.

*Renewal of an Exhausted Bath.*—After a great number of copperings the exhausted liquids are revived as follows:—

Precipitate the zinc in solution by sulphide of sodium, not in excess, and re-charge the solution with sulphate of copper. The constant saturation of the coppering bath may be effected by the following means:—

Introduce into the reservoir containing the cuprous liquid a cylinder furnished at the upper part with an india rubber valve, opening upwards. The liquid should contain hydrated oxide of copper, and the plug be controlled by a sort of ballcock floating in the liquid of the reservoir. In proportion to the diminution of the density of the liquid from the effects of the coppering, the floating ball descends, and by so doing opens the plug. The liquid enters the cylinder and dissolves the oxide of copper; it should be shaken, and when the bath is restored to its normal density the valve will re-close.

The raw materials, of a certain value, which enter into the solutions of copper—that is to say, caustic soda, sodio-potassic tartrate or glycerin, serve thus for an indefinite time.

The advantages attributed by the author to his process, when all the precautions indicated are attended to, are:

1. The perfect adherence of the copper deposited on iron, cast iron and steel.
2. The rapidity, simplicity and economy.
3. The faithful reproduction of the most delicate details.
4. The beauty of the colors.
5. The harmlessness and stability of the solution.
6. The power of repairing articles coppered or covered with any other metal by the author's processes.\*

*Ordinary Bronzes.*—Yellow bronzes bronze in beautiful tints in copper baths without contact with zinc.

The alloy which has been found to furnish the most beautiful tints by the action of cuprous baths was formed of,

Copper	. . . . .	83
Zinc	. . . . .	14
Lead	. . . . .	0.6
Tin	. . . . .	1.3
Nickel	. . . . .	1.1

*Bronzing of Red Copper.*—The bronzing of red copper, even when galvanic, is effected by contact with zinc, by varying the nature of the salt of copper and the proportions of alkali and of sodio-potassic tartrate.

*Zincing.*—Copper or coppered metals may be covered with zinc by immersion in a concentrated solution of potash or of soda heated to 100° in presence of metallic zinc.

The coating of zinc deposited is fixed and brilliant.

The author considers the metal thus deposited to be less attackable by acid liquids than ordinary zinc.

*Tinning and Leading.*—Copper and coppered metals, as well as cast iron, iron and steel, may be tinned and leaded in contact with zinc, by means of a salt of tin or lead dissolved in a strong solution of potash or caustic soda at 50 or 100° Centigr.

A deposit of pure tin or lead is not obtained in this way, for it contains zinc. To produce a deposit of pure metal of increasing thickness, place in the vessel containing the solution of tin

\* For this purpose clean the damaged part with an alkaline lixivium, surround the part with an elastic cup containing the solution, and touch the object with a zinc wire; a fresh deposit is then formed on the metal.

a porous vase holding the alkaline lixivium and the metallic zinc. Plunge the article to be tinned into the outer vessel, and establish communication between the article and the zinc by means of a conducting wire. To revive the lixivium after it has become saturated with oxide of zinc, precipitate by sulphide of sodium.

*True Bronzing.*—Iron, cast iron, steel and other metals may be covered with a coating of alloy of copper and tin (true bronze) by an operation effected without the aid of heat.

This result is produced by adding to the copper bath some stannate of soda, or a solution of bichloride of tin, previously treated with a sufficient quantity of soda; immersing the article in contact with zinc determines the deposition of bronze.\*

*Alkaline Baths Containing other Metals Instead of Copper.*—Tartro-alkaline baths containing, for instance, cobalt or nickel, instead of copper, form no adhering metallic deposit in presence of zinc; they disengage hydrogen. Copper, or metals previously coppered, if heated, become covered with a white metallic deposit, consisting of an alloy of zinc and cobalt, zinc and nickel, &c.—*Lond. Chem. News*, Jan. 5, 1866, from *Annales de Chimie et de Physique*, iv., 374.

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#### METHOD OF HASTENING FILTRATIONS.

To the Editor of the *Chemical News*.

Sir,—In your number 306 (vol. xii., p. 180) you mention Dr. Picard's "Way of Hastening Filtrations" as rather an injurious\* one, and, therefore, few of your readers will have felt inclined to consult the description given in the original paper. I happened to come across the latter, and found that the author himself does not attribute much value to the method you described with a few words, on account of the complication of apparatus, and of the danger of breaking the filter. But he proceeds to propose another arrangement, which obviates both these drawbacks; and since I have found on trial every one of his statements to be correct, I venture to

\*The word *injurious*, we must state, was a misprint for *ingenious*.—  
Ed. C. N.

draw your attention to it once more, and to subjoin a sketch of the arrangements proposed by him, selecting the obviously best modification.

The funnel is elongated, by means of an elastic joint, into a long glass tube, having a kind of loop in its upper part, which serves to keep a constant column of liquid in the tube, and causes it to act as an aspirator.

Having used this contrivance constantly for many weeks, I can but fully confirm Dr. Picard's final statements, of which, therefore, I beg to subjoin a translation :

1. The column of water not exceeding one foot in length, there is never any danger of a filter breaking.

2. The funnels should not have a bulge, but they should be exactly conical, so that the paper filter lies everywhere close on the glass, without any creases or other irregularities; it must then be wetted, and all air-bubbles between the glass and paper must be pressed out with the finger. This preparation is indispensable.

3. If the last-mentioned condition is fulfilled, the rate of filtration is ten or twelve times quicker than without the bent tube. If that condition is not completely fulfilled, but if some air is sucked between glass and paper, so that a row of beads is generated in the aspirating tube, instead of a continuous column of liquor, then the rate sinks to four or five times the ordinary one; but even with filters badly made on purpose it only comes down to three times.

I may be allowed to add that hot liquids are found to work far better than cold ones, in spite of the counter pressure of their vapors, and that in no instance have I noticed any increase in the tendency of some precipitates to pass through the filter,—a disadvantage which can easily be avoided by using the denser Swedish filtering paper, since in the new arrangement the latter is no more objectionable on account of the slowness of its working.

I am, &c.

GEO. LUNGE, Ph. D.

South Shields, January, 2. 1866.

—*Chem. News*, Jan. 12, 1866,

## MANNITE FROM THE OLIVE TREE.

Professor De Luca, of the Royal University of Naples, exhibited at the Dublin Exhibition a series of mannites, which were very interesting, as they were produced from a new source, viz., the olive tree. This sugar seems intimately connected with the formation of the oil or fatty matter.

Mannite, the sugar of manna, mushrooms, and many plants, is a substance that bears a closer analogy to glycerin than even to sugar. Like glycerin, it forms a nitro-compound (nitro-mannite), which explodes very violently when struck. It is prepared by treating mannite with the strongest nitric and sulphuric acid. It forms beautiful fine white acicular crystals, insoluble in water, but soluble in alcohol and ether. If carefully heated, it may be decomposed without explosion; but when it is suddenly heated, it explodes, but not with great violence. It has been proposed to use nitro-mannite for charging percussion caps.\*

Professor De Luca has shown that mannite exists in different proportions in every part of the olive tree. He sent specimens from the green leaves, from the leaves commencing to turn yellow, from the flowers, unripe olive, and the olive commencing to ripen. This saccharine principle is not always found in the same quantity at all stages of vegetation. At the period of blossoming it accumulates in the flowers and diminishes in the leaves. The fallen flowers, having once completed the phenomenon of fecundation, no longer contain any mannite; it has likewise been found impossible to obtain the slightest traces of it in the yellow fallen leaves. Mannite exists in the fruit as long as it continues green—diminishing in proportion as it ripens—and disappears entirely when it becomes perfectly ripe, and contains the greatest quantity of oil. In a private communication, not at present published, Prof. De Luca says that these investigations were commenced in the year 1858. Experiments are still going on to determine at what period of vegetation the fatty matter was formed in the olives, and what is, or what are, the

\* Nitro-glycerin is used for blasting rocks, and is at the present time being successfully used in making the heavy cuttings for the new Dublin Waterworks. Nitro-mannite, if it could be made available, has the advantage of being a solid, whilst the nitro-glycerin is a fluid.

materials which have given it birth. The olives at the commencement of their formation contain a green, and traces of a fatty matter; but proportionally, as the fruit of the olive develops itself and increases, the fatty matter develops itself and increases also.

The chlorophyll (green-coloring matter) which was found in abundance in the leaves and fruits of the olive tree, always accompanies the mannite. The saccharine matter exists in small quantities when the leaves begin to develop themselves; it augments with their progression; diminishes during the flowering of the plant and when the leaves begin to lose their green tint. It disappears entirely when the leaves are yellow and fall spontaneously from the plant.

The leaves of the olive tree are perpetual; that is to say, they do not become detached from the plant until the new green leaves become formed and developed. When the fruits are perfectly ripe, and have lost their green tint, they contain no mannite. When the mannite is exhausted the oil is at its maximum. The decrease of the saccharine and green matter in the olives during the increase of the fatty matter, and the disappearance of those same substances when the olives contain a maximum of oil, show that there must exist some relation between all these matters; and that if the chlorophyll and mannite are assimilated, it is that they give foundation to some other substances, amongst which must figure the olive oil.—*Am. Drug. Circ., Feb., 1866*, from *London Chemist and Druggist*.

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## Varieties.

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*The works of Lavoisier.*—Chemists who have read the “Chemical philosophy” of Prof. Dumas, know the earnest words with which that chemist, in 1836, entered upon the task of getting out a complete edition of the works of Lavoisier. Our readers are aware from our former communications (this Jour., xxxii. 98, xxxv. 262) that this engagement is on the point of being fulfilled, that the edition is in the press, and that three volumes have already been published at the expense of the State.

Many events have prevented the prompt publication of this important

work, although, in 1843, Dumas, then President of the Academy of Science, obtained from the Minister of Public Instruction permission that the publication should be made at the expense of the department. It was not till 1861 that his plan began to be executed: three volumes have appeared; the fourth is in the press; this will be followed by two others, treating of questions on administration, agriculture, political economy, &c.

Lavoisier was a complete man. He was not only remarkable as a chemist and physicist; he was an administrator of no ordinary merit. This is evident in the papers which he has left, and which will appear with the series of unpublished documents that Dumas has collected in part from the family of Lavoisier, and in part from notes made by this unfortunate servant during his journeys, which, as well as his laboratory notes and other papers, were happily preserved, they having been long in the hands of Arago, to whom they were confided by the daughter of Lavoisier.—*Correspondence of Prof. Nicklés, in Silliman's Journal.*

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*Magnesium Light.*—The remarkable properties of magnesium light are now familiar to all. (See this Jour., xl. 287.) Some facts have been recently observed that are not yet generally known. As regards its chemical effects, this light is well fitted to render luminous phosphorescent bodies, as was fully ascertained by Mr. Chautard in the month of January, 1865. This is now a lecture-room experiment. Take a series of wide tubes enclosed in a box and filled with phosphorescent substances. All these tubes are white; but when struck by the magnesium light each becomes phosphorescent, taking its own special color. About a year since, also, Mr. Lallemand discovered that a mixture of chlorine and hydrogen will explode under the influence of magnesium light; and, moreover, that this explosion does not take place in darkness, nor under the influence of the red or yellow rays, as had already been remarked for common light by Gay Lussac and Thenard.

Magnesium ignites even in the vapor of water, when it is brought in contact with it in a tube containing magnesium heated over an alcohol lamp; the metal burns with brilliancy, disengaging the hydrogen. Under the same circumstances zinc will not burn except at a much higher temperature. This observation has just been made by Messrs. Deville and Caron; these chemists satisfied themselves that magnesium, when cold, decomposes water in the presence of the feeblest acids, even of carbonic acid.

If this metal were not so expensive its light could be applied to numerous uses. A recent invention of an Italian, Mr. Carlevaris, may perhaps prove to be a successful application of it. In place of the metal, he takes the chloride of magnesium, which he exposes to a jet of ordinary illuminating gas and atmospheric air with a tenth part of oxygen. The light thus produced is very brilliant and appears to answer admirably for the production of photographic images, or for magnifying them.

At first Mr. Carlevaris used magnesia, and also carbonate of magnesia. But he found afterwards that the chloride gave better results.—*Correspondence of Prof. Nicklès, in Silliman's Journal.*

*Acclimatization of the Ostrich.*—In my letter of April, 1861, I have spoken of the attempts to acclimatize the Ostrich. The Society of Acclimatization continues to watch and encourage these efforts. They now begin to hope that even in temperate climates, the Ostrich may figure among the useful animals. The following are the facts upon which these hopes are founded. We have already seen that these animals can reproduce in captivity, but as yet only in the warm regions of Europe, at Florence, Marseilles, Madrid, or in Algiers. This year, however, a birth of ostriches has taken place in the cooler region of Grenoble, in the garden of acclimatization of the Regional Society of the Alps.

The ostriches at the time of breeding were kept in a chamber. After 46 days two young ones appeared, to which the female seemed as devoted as she had been indifferent to the eggs. On this occasion, as has been before observed, the little ones placed themselves only under the male, and received no nourishment from the parents.

After the results obtained in Spain, and since in England, we may hope also to acclimatize the Cassowary.—*Correspondence of Prof. Nicklès, in Silliman's Journal.*

*On the Hydraulicity of Magnesia.*—M. H. ST. CLAIRE DEVILLE read a note before the Academy of Sciences, December 4, 1865, of considerable industrial importance. He said that seven years ago M. Donny sent him a specimen of magnesia prepared by the calcination of the chloride. Some of this, which was in compact anhydrous lumps, he left for several months under a tap in his laboratory, constantly exposed to running water. In this time it took a remarkable consistence, became hard enough to scratch marble, and as translucent as alabaster. After six years' exposure to the air it has in nowise changed, and its analysis gave the following results:—

Water	.	.	.	.	.	.	27.7
Carbonic acid	.	.	.	.	.	.	8.3
Alumina and oxide of iron	.	.	.	.	.	.	1.3
Magnesia	.	.	.	.	.	.	57.1
Sand	.	.	.	.	.	.	5.6

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100.0

Thus the substance appears to be essentially a crystallized hydrate of magnesia, like brucite, which does not absorb carbonic acid. To prove that it really was so, M. Deville prepared magnesia by calcining the nitrate, powdered it, made it into a semi-plastic mass, and sealed it in a tube with some boiled distilled water. After some weeks the mass became as hard and compact as the other, and also crystalline and translucent. After dry-



ing in the air this mass was found to have the composition  $\text{HO}30.7, \text{MgO} 69.3$ , showing it to be a simple hydrate of magnesia. With similar magnesia the author took casts of medals, as with plaster of Paris, and on placing the casts in water found them to assume the appearance of marble. M. Balard's magnesia—that is, the magnesia prepared by calcining the chloride obtained by the treatment of sea-water,—calcined at a red-heat shows astonishing hydraulic qualities. Calcined at a white-heat for hours its hydraulic qualities are in part destroyed. A mixture of chalk or marble and magnesia forms with water a plastic mass, which after remaining some time in water becomes extremely hard. With a mixture of equal parts of this magnesia and powdered marble, the author hopes to make busts which by hydration will be converted into artificial marble. A mixture of plaster of Paris and magnesia he finds to break up under water. The next experiments are of great importance. The author finds that a dolomite rich in magnesia when calcined below a dull red-heat and powdered and made into a paste, forms under water a stone of extraordinary hardness. M. Deville exhibited to the Academy specimens he had made with the dolomite used by Messrs. Bell, of Newcastle, for making Epsom salts by Mr. Pattinson's process. When the dolomite is strongly ignited and some quick-lime produced, the mass does not set so well, crystals of arragonite separating in thin veins. When dolomite is heated to bright redness, and all the chalk converted into quick-lime, the paste formed with it breaks up in water. All the experiments, M. Deville states, show that the magnesia is the binding material, which in becoming hydrated holds together the particles of chalk or marble to form a compact homogeneous stone. He has exposed some of the stones to the action of the sea in the port of Boulogne, and they at present remain unaltered. The facts contained in this note proved the perfect hydraulicity of pure magnesia by the formation of a definite hydrate.

The experiments with dolomite are of the most importance to us, and no doubt some of our readers will follow up the experiments made by the accomplished author of this note.—*London Chem. News*, Dec. 15, 1865.

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*Chloroform for Removing Stains of Dry Paint.* BY THOMAS B. GROVES, F.C.S.—An accident, involving the loss of several ounces of chloroform at a time when in consequence of a sudden and unprecedented demand, it was peculiarly valuable, introduced me to the knowledge of a fact I was previously unaware of, viz., that chloroform is capable of exerting a powerful solvent action on dry white-lead paint.

The accident happened in this way. The four ounce measure I was using had been broken, and afterwards carefully mended with white lead, several months being allowed for it to become thoroughly hard. In that state it was, as I imagined, capable of resisting for at least a short time, the action of any of the more powerful solvents to be found in a chemist's shop. On pouring chloroform into it, however, I was at once undeceived,

for the bottom fell out immediately, without sufficient warning to enable me to save one drop of the liquid. Had it been mended with barley sugar, and water then poured into it, the effect would not have been more sudden.

To turn this loss to some account I then tried comparatively the respective effects on old paintwork, of Ether, Benzol, Bisulphide of Carbon, and Chloroform. I found that the last, applied on wadding with gentle friction, speedily exposed the clean surface of the wood, whilst the Ether and Benzol removed the more recent only of the layers of paint. Bisulphide of Carbon apparently was without action.

Query, then, would it not be advisable in cases where valuable dresses have been to all appearance spoilt, by paint being allowed to dry upon them, to try the effect of chloroform before giving up all hope? At any rate I shall try it on the first case I meet with. I have already discounted the smiles of the fair ones, whose gratitude I intend to deserve.—*Weymouth*.—*Chemist and Druggist*, January 15, 1866.

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*Cheap Manufacture of Phosphate of Soda, and its use in Manure*.—We read in *Les Mondes* a statement by M. Dumas that coprolites are now made into phosphide of iron containing from 14 to 15 (?) per cent. of phosphorus. This is done by heating the coprolites with iron ores in a reverberatory furnace. The phosphides so obtained are sent to Paris and treated with sulphate of soda, by which sulphide of iron and phosphate of soda are formed. The phosphate of soda and some magnesium salts are mixed with the contents of cesspools, whereby an ammoniaco-magnesian phosphate is produced, and all the ammonia and phosphates in the urine and fecal matters are fixed. This plan of treatment is the invention of M. Boblique.—*London Chem. News*, Jan. 5, 1866.

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*Process for Rendering Wood Plastic*.—A very simple method of rendering wood plastic has recently been discovered. It consists in injecting diluted hydrochloric acid into the wood under a pressure of about two atmospheres. The duration of the operation must be regulated by the nature of the wood, the bark is not removed, and by a very simple arrangement the liquid injected at one extremity may be partially collected at the other. If the green wood is submitted to pressure, the celluloses having been previously washed with water, it may be reduced to a tenth of its original size; the fibres may be excessively compressed without breaking or tearing, and when dry have no tendency to resume their natural condition. Woods treated in this way will serve for many purposes. If after the treatment with hydrochloric acid the wood is washed and dried, it may be cut and chiselled with great facility, and serves admirably for sculptural purposes. The wood is dried by passing air under pressure through the celluloses at about 37°, the moisture is rapidly expelled, and as the mass contracts evenly throughout, there are no cracks. Colors or the various substances which prevent wood from rotting may be injected in a similar manner;

soluble glass or freshly precipitated silica renders it very durable and at the same time incombustible.—*London Chem. News*, Dec. 29, 1865, from *Wochenschr. des Nied. R. Oest. Gew.-Vereins*, 1865, p. 502.

*Dentists' Hard Rubber.*—A paper on Hard Rubber, by Dr. Wildman, was presented and read by Dr. Buckingham, before the *American Dental Association*, giving the results of some of his experiments, analytical and synthetical. Finding the manufacturers of the rubber compounds for dental purposes extremely reticent as to its composition, and but little more knowledge to be gained from the specifications of the patents, the Doctor instituted a series of experiments, to obtain a better knowledge of the value of the different compounds vended for the use of dentists. A number of experiments are detailed to test the amount of earthy matter in different rubbers found in the market; of these, the American Hard Rubber Company's left five and four per cent. respectively of ash, one of the doctor's make three per cent., while the English rubbers and others of home manufacture left a residuum of from forty to sixty per cent. when brought to a white heat. Proceeding with the process of manufacturing different samples, we learn that, in making rubber compounds, the caoutchouc may be mixed with sulphur and the coloring matter, by being passed repeatedly between steam-heated rollers, or, for experimental purposes, the caoutchouc may be first reduced to a pulpy state by some one of its solvents, and the sulphur and other substances—being previously ground very fine—thoroughly incorporated with it. The solvents used are naphtha, benzine, or oil of turpentine, which are afterwards evaporated by exposure of the mixture to the air on plates of glass. Several different compounds, of various colors, are described in their composition. Caoutchouc being the cement which binds all the materials together, a glance at the accompanying table will show the great inferiority of the English pink to either the brown or red rubber for dental purposes. When the composition contains but a small proportion of this cement, its weakness of texture would render it liable to produce injurious effects by its susceptibility to abrasion in the mouth. The following table gives very nearly the percentage of caoutchouc contained in the doctor's formulæ, and also that of the English pink rubber:

	Caoutchouc.	Sulph.	Verm.	Sul. Cad.	Ox. Zinc.	Parts in
Brown . . . .	66 $\frac{2}{3}$	33 $\frac{1}{3}$	—	—	—	100
Red . . . .	44	22	30.0	—	—	99
Yellow . . . .	44	22	—	33.0	—	99
Pink . . . .	42 $\frac{2}{3}$	21 $\frac{1}{3}$	9.0	—	27	100
Buff . . . .	35.4	17.7x	7.3	4.4	35.4x	100
Drab . . . .	44	22	—	—	33	99
Light . . . .	28.5x	14.3x	—	—	57.1x	100
					black.	
Black . . . .	50	25	—	—	25	100
Yellow . . . .	40	20	—	—	40	100
					white earthy matter.	
English pink . . . .	24	52	12	—	48	102
					— <i>Dental Cosmos.</i>	

## Editorial Department.

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THE NEW PROFESSORSHIPS IN THE UNIVERSITY OF PENNSYLVANIA.—With the month of April this new School of Science will commence its work. Of the sciences to be taught, those of Botany, Mineralogy, and Zoology interest the Pharmaceutical student. The Botanical course, by Prof. R. C. Wood, is particularly worthy of the attention of apothecaries and students of Pharmacy, and we are informed that, with the view of encouraging the attendance of apothecaries, students of the Philadelphia College of Pharmacy are admitted without charge for matriculation, and at the reduced price of \$7.50 per ticket. The botanical lectures are between 4 and 5 o'clock, P. M., and we earnestly invite attention to them.

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ALUMNI ASSOCIATION OF THE PHILADELPHIA COLLEGE OF PHARMACY.—  
“*Dear Sir*: You are respectfully invited to attend the Annual Meeting of the Association; the preliminary session to be held on Friday afternoon, March 16th, 1866, at 3½ o'clock, and the general session on Saturday afternoon, March 17th, at the same hour, in the Hall of the College. If unable to attend, any communication you may have to present should be addressed to the undersigned.

“Very respectfully,

WM. C. BAKES, 800 Arch St., Philada.”

We are reminded by this notice of the great object kept in view by the Alumni Association, viz., the creation of a fund to sustain a practical school of chemistry and pharmacy, under the auspices of the Philadelphia College of Pharmacy; and the question has repeatedly forced itself on our attention,—“In what way can the intentions of the donors be most effectively carried out with the means to be provided, so as to prove most useful to the students who may attend it, and most creditable to the College whose reputation it will involve?” We have asked this question of some of the gentlemen most prominently engaged in the movement, but have found that their attention seemed directed primarily to the creation of the fund, believing that the Board of Trustees of the College will be able to shape and create the schools when the proper time arrives. With due deference to those holding this opinion, we believe it to be but just to those who are asked to contribute to the fund, to present a well digested scheme or programme of the Constitution of the school proposed to be founded, including even some of the details of the cost of material and apparatus required to start it for a limited number of students, the time that would be devoted

to practice daily, and an outline of the manner of giving instruction in each of the two branches to be taught. Some such outline of the main features of the tuition to be given should be prescribed by the Constitution of the School, leaving the lesser details to the Professors who may be appointed to carry them out.

The question will then come up, whether this instruction is intended to *perfect* students who may be in shops unfavorable for gaining a practical experience, or whether it is to be a substitute for the shop? We hope not the latter. While the curriculum should involve an examination in the rudiments of Pharmacy, and where these have been but imperfectly attained it should insist on their acquirement, yet the main and true object of the School should be to give perfect lessons in pharmaceutical manipulation with the best forms of apparatus, and to afford the student full opportunities to become skilful in their uses and applications, especially of those which the tendency of latter years has nearly banished from the shop. For instance, the important processes of solution, evaporation, and distillation, and their use in making tinctures, syrups, fluid extracts and extracts, distilled waters and oils, and which should involve a large portion of the attention of the apothecary in his laboratory and shop, when not engaged in dispensing. Then will come furnace operations, the purification and crystallization of salts, the preparation of cerates, ointments, and plasters. When these laboratory operations have been practically studied, the course should include exercises in all those numerous details involved in dispensing, and called extemporaneous pharmacy,—as pill making, plaster spreading, the preparation of suppositories, emulsions, mixtures, capsules and granules, pill coating, etc. The exercises in these might begin before the laboratory course was completed, as an alternative on a certain day or days of the weekly programme, so as to carry on both together. The course might appropriately terminate with a well arranged exercise in dispensing prescriptions, which should be chosen to include some of the most difficult and perplexing examples of this responsible engagement, which occur in the daily routine of a well established shop.

The course on Practical Chemistry will be the most elaborate and the most expensive, both as regards time and material. It naturally divides itself into two parts: Preparative Chemistry and Analysis. It is to be presumed that every student who enters on this course will have had some knowledge of the elements of Chemistry, either by home study of books, or from lectures, for, whilst each student would have his own practical orbit to revolve in, and in which he would have the personal instruction of his teacher, yet, without preliminary preparation, it would be difficult to carry on a class so that such beginners could avail themselves of the general remarks of the Professors on those occasions set apart for comment on processes involving important principles of chemical philosophy.

It is true that the lectures of the College, progressing at the same time would meet this difficulty in regard to beginners at the winter course, ye

the order of the subjects, as taught practically and theoretically, would prevent them from being carried on *pari passu*; and, besides, the Spring course would not be attended by lectures. Nevertheless, the lectures on General Chemistry in the College would prove a most powerful auxiliary to the practical school, especially if they should both be under the direction of the same Professor, and if carried on in such a relation to each other as to shed mutual light; the one yielding products to illustrate theory, the other principles to explain practice. We presume the first part of this course would be to familiarize the student with apparatus and manipulations of a rudimentary character, as in the pharmaceutical course, to fit him for commencing the preliminary study of chemical bodies, to attain a certain degree of familiarity with which seems to be requisite before entering regularly on their thorough examination. It is hardly necessary to say that the latter should be gone through before entering upon analysis,—at least before commencing a course involving the qualitative and quantitative analysis of inorganic and organic bodies.

If this proposed branch of our College operations should be established and consolidated by a few years' experience, we have no doubt that it will prove a most valuable source of practical knowledge to a numerous class who, otherwise, will continue badly fitted for their pharmaceutical duties. Further, the analytical school, would add greatly to the reputation of the College, and as it would be the duty as well as interest of the Board to keep the standard high for truthful accuracy, this reputation would bring to the School much outside patronage for commercial, medicolegal, or mining analysis, which would add to the income of the teacher.

The class of persons who it is anticipated would avail themselves of this School, include, 1st, regular College students, who can have the time; 2d, young pharmacutists in distant places, where they cannot learn the practical parts of their business thoroughly, and who, in a single course of five months, could obtain what they need; 3d, amateur students of Chemistry, who wish to take the practical and analytical course to become thoroughly familiar with laboratory manipulation.

It may be asked, "would apothecaries' apprentices take the course on practical Pharmacy?" That will depend upon whether their positions afford them opportunity to learn the proper details of their business, and their disposition to become thorough apothecaries. (It will also be influenced by the dispositions of their employers, and their pecuniary ability.) But few of such would need the rudimentary part of the course, yet even this would not hurt very many who believe themselves experts. That part of the course on preparative (or manufacturing) pharmacy,—*a branch of the business now much neglected by a large number of drug-store keepers*,—would be most sought, and it is this feature of the proposed School, as a set-off to the hurtful effects on the rising generation of pharmacutists of the wholesale manufacturing of pharmaceutical preparations, which should give to this scheme a liberal encouragement.

Having said this much, it will not do to pass unnoticed the great preliminary work of raising the fund of ten thousand dollars, which the Alumni Association have so zealously taken in hand. Among the graduates since 1827,—nearly forty years,—many have been successful in business, and many others in a fair way to be so. From this source the Association expect mainly to succeed, presuming that as graduates of the College they will naturally feel a disposition to do it a good turn. But we trust in an educational enterprise so excellent in its tendencies, and capable of producing fruits so rich in advantages to the pharmaceutical and medical professions, our wholesale druggists and manufacturing chemists will extend a liberal contribution to aid the efforts of the Alumni.

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THE CAVENDISH SOCIETY.—For the information of such former subscribers to the Cavendish Society as have discontinued their subscriptions, owing to the high price and irregular issue of the publications, we will state that the Society at present issue but a single volume for each year's subscription, and that the only work in progress is Gmelin's hand-book, of which the 16th volume was published in 1864, on the subscription for 1862. The Editor of this Journal, in the capacity of agent of the Society, notified the subscribers of the publication of the 16th volume last year: but a few responded to the call, and these have been duly supplied with the volume. The invoice then received having been exhausted, it is suggested to all those who are disposed to continue their subscriptions, to forward the amount (*five dollars in gold, or its equivalent in currency,*) to the Agent as early as possible, as hereafter the volumes must be paid for in advance of importation.

It is the opinion of Dr. Watt, the Editor of Gmelin's hand-book, that the next, or 17th volume, will conclude the text, and that the index which is now in preparation will constitute the 18th or last volume of the work. The cause of delay in the publication of the 16th volume was the slow preparation of the German original, and the same cause is now operating in retarding the 17th volume, which, however, is expected to be ready this year. The completion of this great work will be hailed with satisfaction by every English and American chemist, and when the Index is ready to give a key to every portion of its immense collection of facts, its usefulness will be proportionately increased. The agent has in hand two sets of Gmelin's hand-book and several duplicate copies of the volumes from X. to XV. inclusive, which will be furnished at the Society's rates with the expenses of importation added. All who have failed to complete their sets of "Gmelin" would do well to attend to it early, as when the work is completed, this agency will probably be discontinued. The agent would also inform the scientific public that he has in store, on account of the Society, ten copies of Bischof's Chemical and Physical Geology complete, and several copies of Laurent's method, and the life of Dalton. It should be

distinctly understood that all payments on the Society's account and for duties, must be in gold, or its equivalent in currency.

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*Proceedings of the American Pharmaceutical Association at the Thirteenth Annual Meeting, held in Boston, Mass., September, 1865; also, the Constitution and Roll of Members.* Philad. 1866, 260 pp. octavo.

Before this number reaches our readers, those who are members of the Association will have received their copies of the "Proceedings" for 1865. After the delay of last year, it was generally anticipated that this volume would appear more promptly, but despite all the resolutions and precautions adopted by the Association, the Editor was not able to put the complete copy in the printer's hands until the 17th of January, although at that date much of it had been in type for months. A hurried glance over the book shows a full record of minutes, a meagre report on the progress of Pharmacy, but forty pages of answers to scientific queries, and thirty-six pages of volunteer papers; it is, in fact, the smallest volume since 1857. In looking for the cause of this deficiency of bulk, it will be found chiefly in the Report on the Progress of Pharmacy, which is less than 50 pages, against 123, 127, and 142 in the previous three years. The Chairman attributes it partially to causes over which he had no control, and largely to the inaccessibility of foreign journals, which delayed action upon them until too late to include much valuable information that might otherwise have been included from foreign sources. No one can fully appreciate the labor of preparing a report of this kind without they have undertaken it. Without a knowledge of the German and French languages, (or liberal aid from those who have it,) and a free access to the foreign pharmaceutical periodicals, it will be difficult, if not impossible, to prepare papers like those which for the previous three years have marked the Proceedings. The Report differs from most of its predecessors by a more detailed account of the papers to which it refers, which enables the reader to get a good idea of their contents.

Of the special reports and essays, we have published previously or in this number most of those which were read at the meeting, and some of the others we hope to print in future numbers. As a whole, the volume is very interesting and instructive; the paper on percolation alone is worth the cost of the volume, and the discussions appended to the minutes add very much to their interest and usefulness as a record of the proceedings.

A new feature of the volume is the Roll of Members, which is now classified in eight groups, consisting of honorary, active, and deceased members, and those whose names have been directed to be stricken from the rolls for neglect of payment of their contributions, because of resignation, or from not having signed the Constitution.

The paper, printing, and binding, are much as the previous year, and do not come up to some former volumes, when materials and workmanship were less costly than at present.



ACADEMY OF NATURAL SCIENCES.—An address, emanating from a large Committee of this Society, directed to all public spirited citizens who feel an interest in the promotion of science and the sustenance of this useful Institution and its valuable collection of natural objects, has been received. The object of the appeal is to raise by voluntary contributions the sum of \$100,000, for the purchase of a lot of ground and the erection of a building to accommodate the collection now existing, with ample space for future additions. The present building is much too small to admit of the display of the specimens belonging to the Academy, which are suffering for want of the necessary accommodations. The address sets forth the reasons why this Institution should be liberally sustained; what it has done and is doing towards creating a taste for studies in Natural History, and by the semi-weekly gratuitous exhibition of its collection; the quiet and unseen influence which its exceedingly valuable scientific library of 30,000 volumes is affording to the scientifically inclined public, as any person introduced by a member may freely consult its pages. The following quotation from the address will explain:

“It is conjectured that not less than \$100,000 will be required to accomplish the object in view. For this reason the payment of subscriptions is made contingent on the whole amount being subscribed within the present year. It is desirable, however, that a considerably larger sum should be at the service of the Institution, to secure sufficient income to pay skilled workmen to preserve the Museum, the contents of which are too valuable and too extensive to be confided to the voluntary labor and care of members. Even if the growth of the Academy is to be arrested now, as it will be if its appeal to the public shall fail, a considerable increase of revenue will be necessary to preserve it even in its present condition.”

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THE VOLUME OF PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.—Attention is called to the following note from the Chairman of the Executive Committee:

“*Editor American Journal of Pharmacy,*—

“The Executive Committee respectfully ask you to call the attention of your readers to the Proceedings now issued, and especially to the fact that complete sets of the Proceedings can be supplied, for the first time. (For terms see Prefatory Note.) The amount of valuable information is so great that no pharmaceutical library can be deemed complete without them.

For the Committee,

Feb. 15, 1866.

THOS. S. WIEGAND, *Chairman.*”

By reference to the Prefatory Note of the volume for 1865, just issued, we find that copies of the Proceedings of 1851 to 1856, inclusive, in pamphlet form, can be had for 25 cents each; that for 1857, bound, 70 cents; 1858, \$1.50; 1859, \$1.50; 1860, \$1.00; 1862, \$1.25; 1863, \$1.25; 1864, \$1.50; 1865, \$1.50. The Committee say that the eight bound volumes and six pamphlets may be had for \$11.00, a sum within the reach of all

who feel an interest in the Association, and that the entire set *unbound*, except for 1862, '63, and '64, may be had for \$9.00.

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OBITUARY. SIR WILLIAM JACKSON HOOKER.—This eminent Botanist and botanical writer died at Kew, so long the scene of his labors and usefulness, in the eighty first year of his age. He was born on the 6th of July, 1785, at Norwich, Eng. His father attained even greater age. He attended at the Norwich high school, and the accidental discovery of a rare moss gave the direction of his studies to botany. He made tours to the wilds of Scotland, the adjacent islands and to Iceland, in 1809, having become acquainted meanwhile with Sir Jos. Banks, Solander and other botanists. His success in the delineation of plants was quite remarkable, and was the cause of the illustrations of his numerous botanical works. Having been pecuniarily unfortunate, he obtained, through the influence of Sir Jos. Banks, the Regius Professorship of Botany in the University of Glasgow. "Here for twenty years, the most productive years of his life, he was not only the most active and conspicuous working botanist of his time and country, but one of the best and most zealous of teachers." His works are too many to even enumerate in this brief notice. When Kew Gardens were converted into a great national establishment by act of Parliament, Sir William J. Hooker was appointed to its direction, and during the remaining twenty-four years of his life he devoted his time and energy to the development and extension of this now extensive and wonderful collection of all that is interesting to the botanist. This hasty outline, gleaned from the excellent notice by Prof. Asa Gray, in *Silliman's Journal*, would be incomplete did we not allude to his single-minded and conscientious pursuit of science and his kindness and liberality to younger botanists. His son, Dr. Jos. Dalton Hooker, succeeds him as director of Kew.

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*Journal of Applied Chemistry*, devoted to Chemistry as applied to the Arts, Manufactures, Metallurgy and Agriculture. New York, January, 1866. Vol. I. No. 1, quarto, pp. 16. Dexter & Co., Publishers.

This new Monthly Journal, published under the editorial directions of Prof. H. Dussance, Chemist, is addressed to manufactures, chemists, druggists, agriculturist, and all who desire late information on technology and manufacturing chemistry. We find many points of interest in the number received, and observe quotations and lists of the New York, Boston, Philadelphia and Calcutta markets, which we presume are to be kept up monthly.

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*The United States Medical and Surgical Journal*, Dr. G. Shipman, Chicago, January, 1866, and *The New York Medical Journal*, Feb. 1866, have been received.

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THE ANNUAL COMMENCEMENT of the Philadelphia College of Pharmacy will be held at the Musical Fund Hall, on the evening of Saturday the 17th of March, 1866, to which the friends of the College and the public are generally invited.

THE  
AMERICAN JOURNAL OF PHARMACY.

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MAY, 1866.  
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AN ESSAY ON SENNA AND ITS ACTIVE PRINCIPLE.

BY ROBERT RAU, Bethlehem, Pa.

(An Inaugural Essay presented to the Phila. Coll. Pharm., 1866.)

There is perhaps no drug in our list of *Materia Medica*, in the chemical analysis of which so much difficulty seems to have been found, and concerning the results of which analyses so much variance and discrepancy exist. The active or purgative principle has for a long time been supposed to be represented by an amorphous, extractive-like substance, which has been termed "Cathartin." Within a few years this idea has been abandoned, and certain chemists have pronounced as their conviction, that the principle in question is analogous to that existing in the officinal species of *Rheum*, and found in *Rumex Crispus*, and in several genera of the order "Polygonaceæ."

The writer of this has found recorded no process nor conclusive arguments on which this announcement is founded; moreover the existence of the same purgative principle in two drugs so widely different in their botanical relations, and differing even in their more particular medicinal effects, cannot but seem very remarkable and, indeed, not very plausible. It is true, we have examples in the history of medicinal organic products in which the same principle exists in plants seemingly different in outward characters, and separated in botanical classifications.

Thus we find the alkaloid "Berberina" in the genera *Podophyllum*, *Berberis*, *Cocculus*, *Hydrastis*, *Coptis* and *Xanthorrhiza*; these representing the natural orders *Ranunculaceæ*, *Ber-*

beridaceæ, Menispermaceæ and Anonaceæ. But on examining and comparing the relationship of these orders, we will find them to possess many marked points of resemblance, indicating their close alliance in natural classification, which, indeed, warrants their consecutive arrangement in botanical works. But to bring the natural orders "Polygonaceæ" and "Leguminosæ" together, for points of resemblance even in outward characters, is beyond reasonable possibility. From such a train of reasoning we have therefore the greatest reason to doubt the fact of the existence of chrysophanic acid as the purgative principle in Senna; and it was the purpose of the writer of this paper to direct the course of his experiments primarily to prove whether this principle was to be found in the drug. The first experiment made was founded on the well known fact, that the purely alcoholic tincture of the leaves possessed *no* purgative properties.

*Exp. I.* Two ounces of Alexandria Senna, freed from stems and legumes, were powdered and treated in a displacer with stronger alcohol, until the menstruum passed through colorless. The resulting tincture was of a deep olive brown color, and possessed a nauseous, bitter taste. It was evaporated to a small bulk of syrupy extract and thrown into a pint of water. There was deposited an insoluble, brown resin, while the water remained green and turbid, even after several filtrations.

The precipitated resin had an acrid, bitter taste, and was readily soluble in alcohol. Its solution, agitated with animal charcoal, filtered and evaporated, left the resin of a much lighter color, but having the same nauseous odor and taste. It was readily soluble in a solution of caustic soda, from which it was precipitated, evidently unchanged by the addition of any of the stronger acids. It was partaken of in several doses of five grains, each dose being equivalent to *ʒi.* of the drug, but produced no purgative effect whatever.

The powder remaining in the percolator, after its exhaustion by alcohol, was acted on by cold water. The resulting infusion was of a deep brown color, perfectly transparent, and differed from a common infusion in not having so intensely nauseous a taste. Salt of the peroxide of iron produced a greenish black color, rendered lighter by slight ebullition, while gelatine gave

no precipitate, indicating the probable presence of "Gallic Acid." A solution of basic acetate of lead was added to the infusion as long as a precipitate was produced. This was of a dirty yellow color, and was collected on a filter. The excess of lead was removed from the filtrate by the cautious addition of sulphuric acid. After filtration from the precipitated  $\text{PbO}, \text{SO}_3$ , the liquid was of a pale straw color, and possessed a rather agreeably sweet odor and taste. It was evaporated to a small bulk, when there were deposited in the capsule, small, distinct yellowish crystals, seemingly insoluble in water, alcohol or ether, but were rendered white by agitation with these liquids. At the intimation of Prof. Procter of the possibility of this product being  $\text{CaO}, \text{SO}_3$ , some of the crystals were agitated with distilled water; to a part was added a solution of oxalate of ammonia, and the remainder was treated with a solution of nitrate of baryta. Both these reagents afforded the characteristic reactions of lime and sulphuric acid, the base having pre-existed in the senna leaves, and the acid resulting from the removal of the lead in the process gone over. The solution was farther evaporated, by a gentle heat, to an extractive mass, having an exceedingly sweet, and at the same time nauseous taste.

Suspecting the presence of a variety of grape sugar, a small portion was subjected to Trommer's test, which gave immediate evidence of glucose. There was apparent also in the extract a notable proportion of lime. Twenty grains taken in aqueous solution produced no cathartic effects upon the bowels.

*Exp. II.* To find the percentage of  $\text{CaO}$ , existing in the drug, two troyounces of the leaves were exposed to a full red heat in a crucible. The resulting mass of ashes was exhausted of inorganic salts by water, acidulated with muriatic acid. The lime was precipitated as oxalate, by oxalate of ammonia. The oxalate of lime was collected and heated in a porcelain crucible until the vegetable acid was sufficiently decomposed. The resulting mixture of  $\text{CaO}$  and  $\text{CaO}, \text{CO}_2$ , was repeatedly treated with a solution of carbonate of ammonia, heated and weighed, until the farther addition of the carbonate produced no increase in weight. The  $\text{CaO}, \text{CO}_2$  thus produced weighed 52 grains, containing, therefore, about 29 grains of  $\text{CaO}$ , showing the per cent. of lime in senna to be 3.03.

In an article on chrysophanic acid, (Amer. Jour. of Pharm., vol. xxx. p. 442), the various reactions and properties of this vegetable principle are enumerated; and a special stress is laid upon its superior solubility in benzole. On the strength of these observations the next experiment was made.

*Exp. III.* Two ounces of senna leaves, powdered, were exhausted of inert resinous matter by alcohol. The mass was dried, re-packed in the instrument, and percolated with benzole. This menstruum passed through colorless, and after spontaneous evaporation left *no* residue. The mass of leaves was now moistened with very dilute sulphuric acid, dried and again treated with benzole. The result, after the evaporation of the benzole, was, as in the first trial, entirely negative. At the desire of Prof. Procter, and based upon the volatility of chrysophanic acid, the next experiment was performed.

*Exp. IV.* An ounce of senna leaves was carefully dried of adherent moisture, and subjected to a gentle increasing heat in a "Mohr's subliming apparatus." There were *no* vapors given off until the heat was urged sufficiently to char the drug, when volumes of smoke were evolved; nor was any deposit formed on the condensing cap, except finally a faint film of carbon.

*Exp. V.* Eight ounces of leaves were exhausted by cold water, the infusion evaporated to the consistence of an extract, first by rapid boiling, and towards the close by a more moderate heat. This extract proved actively cathartic in a dose of 24 grains, (equivalent to  $\frac{1}{2}$  of the leaves), thus plainly disproving the assertion so frequently made, that an extract does not represent the activity of the drug, owing to the decomposition of the active principal by heat. The cold infusion possessed great aptitude to undergo fermentation, owing, doubtless, to the large proportion of glucose present, excited by the presence of some vegetable nitrogenized principle, like albumen, especially as the liquid after boiling and filtration was found to be more permanent.

The aqueous solution of this extract of senna was precipitated by the addition of liquor plumbi subacetatis, and, after filtration, the excess of lead was removed by a current of H<sub>2</sub>S.; the liquid was filtered and evaporated to the consistence of an extract; this

was exhausted by Alc, again filtered, and the lime precipitated by the cautious addition of oxalic acid. After filtration, the liquid was evaporated to an extractive mass. This, then, represented the "Cathartin" of former investigators. Of the identity of *this* substance, as the active principle of Senna, there have been many reasons for doubt, and Bley and Diesel considered it as a mixture of "resinous and extractive matter."

This substance had a nauseous odor and taste, its sweetness suggesting the presence of sugar, and by Trommer's test it gave immediate evidence of glucose. Taken in doses equivalent to three and four drachms of the leaves it failed to evince any purgative effects. From this fact, the writer, as would seem quite proper, argued that the active principle had been seized upon by the subacetate of lead, and must be sought for in the precipitate, thrown down by this reagent in the original infusion of Senna.

The precipitate was therefore thoroughly washed with cold water, until traces of lead were no longer evident in the washings. After being cautiously dried it was boiled in alcohol. This menstruum became of a deep yellow color, which turned to a brownish red upon the addition of an alkali. This was evaporated to a small bulk, when there were deposited on the sides of the dish small green masses; these were collected, and dissolved in ether, to which they imparted a most beautiful green tint. This was evidently chlorophylle, the green coloring matter of the leaves. The concentrated liquid, still containing the yellow coloring matter, had become deep red, and was agitated with repeated portions of ether, to which it imparted a fine yellow color, which was immediately changed to a delicate pink by the addition of any alkali. In the original liquid (after affusion with ether) there remained a red, resinous matter. That these substances were but coloring matters, and in no wise connected with the purgative properties of the drug, was proved by their non-action upon the bowels, in doses even equivalent to two ounces of the leaves. The yellow resin thus produced is doubtless that denominated "Chrysoretin" by Bley and Diesel, and possesses, in common with chrysophanic acid, the property of being reddened by alkalies; it could not be obtained in crystalline form, but remained as a resinous mass. It was insoluble also in benzole, thus differ-

ing in this all important respect from chrysophanic acid. These coloring matters had not been in combination with the oxide of lead in the precipitate, but had been rendered insoluble in the infusion, and had been carried down mechanically and diffused throughout the precipitate. The lead precipitate was suspended in water, and decomposed by a current of HS, the liquid removed from the precipitate Pb<sub>3</sub>S and evaporated. This mass did not possess any peculiar taste, was of a gummy nature, and an acid reaction, owing to the presence of the vegetable acids existing in the drug, such probably as gallic, malic or citric. The sulphide of lead, instead of being, as usual, rejected, was collected, dried and boiled in alcohol. This liquid became of a brownish color, and left, on evaporation, a resinous substance, extremely nauseous, and similar in taste to the inert resin extracted directly from Senna by stronger alcohol. It is insoluble in water, but readily soluble in alcohol and ether.

The power of sulphide of lead as an absorbent was in this experiment somewhat exemplified; and it occurred to the writer of this, that this property might be taken advantage of in some earlier steps of the experiment.

*Exp. VI.* Eight ounces of Senna were infused in boiling water for fifteen minutes, the liquid strained, precipitated by liq. plumbi subacetatis, filtered, and the excess of lead removed by HS. The sulphide of lead was collected, dried, and boiled in ether. This, upon spontaneous evaporation, yielded interlaced, acicular crystals of a dirty white color. These gave on first trial no impression of taste to the palate; but in a few moments there became evident a nauseous, bitter and extremely persistent taste. They proved to be insoluble in water, hot or cold, insoluble in cold alcohol, but were soluble in hot alcohol, ether, and especially in chloroform. The ethereal solution was neither acid nor alkaline to test paper. They were insoluble in dilute acetic acid, and also in alkaline solutions, thus proving the substance to be a neutral principle.

The entire quantity which remained, amounting to nearly five grains, was taken at once, and proved actively purgative in five hours. A small proportion of animal charcoal was added to the liquid which had yielded the crystalline matter to the sulphide



of lead, the mixture well agitated, filtered, the animal charcoal dried and treated with boiling ether. This, on evaporation, yielded an additional crop of the same crystalline substance. No more could be obtained, however, by a repetition of the process, at least not more than an additional grain or two.

That this neutral crystalline substance is the long sought for "active principle of Senna," the writer feels convinced, especially upon the similarly successful determination of several experiments since made with the drug, and the undoubted purgative properties of the new product.

On heating 10 grains of the crystals in a porcelain crucible, they fused, took fire, and left a mass of porous charcoal, which was entirely burnt upon a red hot iron plate. The active principle was blackened by sulphuric acid very quickly by the aid of heat. These tests show it to be, without dispute, an organic principle.

Thinking it worthy of experiment to examine into the medicinal powers of our indigenous, officinal species of cassia, "*Cassia Marilandica*," which grows so profusely along the sandy river banks of our neighborhood, the writer collected a quantity of the leaflets directly after the maturity of its showy yellow flowers. An extract was prepared by evaporating the infusion, which possessed in some degree the taste of the extract prepared of the imported Senna. This proved cathartic in doses, equivalent to  $\bar{3}$ ss. of the leaflets, notwithstanding the assertion of some authorities, that this species of cassia is entirely inert. Upon examination, the plant yielded all the coloring matters found in the commercial varieties, a somewhat similar resin, though decidedly less acrid and nauseous, a large amount of glucose, and the same crystalline cathartic principle, the yield of this, however, being smaller.

It is noteworthy that the percentage of active principle thus obtained is so exceedingly small. The rather unscientific method of its isolation may in a great measure account for this. Upon further investigation, and by capable experimenters, it will no doubt be found to exist in larger proportions in the drug, and more advantageous methods for obtaining it will be probably devised.

According to the foregoing experiments and results, the following may be set down as the constituents of Senna :—

1. A resin, soluble in alcohol and ether.
2. Gum.
3. A brown coloring matter.
4. A yellow coloring matter, "Chrysoretin."
5. Chlorophylle.
6. Vegetable albuminous matter.
7. Glucose.
8. A neutral, crystalline, purgative principle. [Sennin.]
9. Lime.
10. Gallic, and citric or some similar vegetable acids.

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### UNGVENTUM HYDRARGYRI.

BY GUSTAVUS PILE.

(An Inaugural Essay.)

In view of the fact that many preparations of Pharmacy formerly made by the apothecary are now furnished by the manufacturing chemist, it would appear but reasonable that the Pharmaceutist should be able, approximately at least, to ascertain the reliability of the articles he may purchase, as to purity and strength. Accordingly, tests are instituted, either mechanical or chemical, by which the value of many preparations is readily and satisfactorily determined.

In the present state of the knowledge of Pharmaceutists generally, the more simple the tests the better: complicated proceedings, or very nice arrangements of apparatus, would deter many druggists from undertaking the operation; and, although the analytic chemist, with his varied apparatus and reagents, would give more satisfactory results, yet, generally, such accuracy is not needed.

The writer, in casually experimenting with a lot of mercurial ointment, in order to ascertain its strength, was led to believe that the subject would prove acceptable for a thesis, and accordingly has noted down some observations which he thinks to be not generally known.

The determination of the relative amount of mercury present

in a sample of mercurial ointment may sometimes be a subject of importance; in fact, a druggist should make sure of the value of every lot he buys, and be satisfied that he keeps an official article.

Some place great dependence on the color and consistence of the ointment, and if these are as they should be, and the mercury is properly extinguished, they feel satisfied; but these appearances can easily be imitated by dishonest persons, and the ignorant, unwary or credulous druggist might be deceived.

A surer and more satisfactory evidence is found in the analytic test usually applied, that is, by extracting the mercury in a free state by distillation; we then have a clear demonstration, not only of the amount used, but also, if any portion of it has been substituted by other metals or impurities.

From various experiments made by the writer to ascertain the readiest process for separating mercury from the ointment, the three following methods were found to give results sufficiently accurate for the Pharmaceutist.

The ointment used in these preliminary experiments was carefully prepared by himself with the exact proportions of the Pharmacopœia.

*Exp. 1.* A portion of the ointment to be tested is put in a test tube, and to it added four or five times its bulk of ordinary hydrochloric acid; the whole is then boiled till the grease entirely separates and floats clear on the surface, an operation requiring but a few moments; pour off the liquid portion, being careful not to lose any of the finely-divided mercury. Boil the residue once or twice more with fresh portions of the same acid, until the mercury forms a globule; this is then to be washed with water, dried on bibulous paper and weighed.

With fifty grains of the ointment treated in this manner, I obtained twenty-four grains of mercury.

*Exp. 2.* A portion of the ointment is introduced into a test tube, and a strong solution of caustic soda added: these are boiled for a few minutes, and then allowed to stand, that all the black powder may settle; decant the liquid portion, and wash the residue with hot water, afterwards boil the finely-divided mercury with some hydrochloric acid, which will cause it to run into a globule; this should then be washed, dried and weighed.

With fifty grains of the ointment treated in this manner, I obtained twenty-three and a half grains of mercury.

*Exp. 3.* This is performed by dissolving out the grease by means of highly rectified benzine, and washing the residue with stronger alcohol; the resulting black powder is then to be boiled with a portion of ordinary hydrochloric acid, so that the mercury may form a globule, which is to be washed, dried and weighed.

With fifty grains of the ointment treated in this manner, I obtained twenty-three grains of mercury.

Of these three methods, the first is by far the best, yielding the mercury in a pure state with less trouble than the others, and the whole operation may be performed in a few minutes. By comparing the results of these tests, it will be seen that the first will give the largest amount of the mercury; it is also, therefore, the most accurate.

In no instance, however, did I obtain the whole amount of mercury employed in making the ointment. The bulk of the mercury being so small, the slightest loss would be perceptible when weighed; the finely-divided state of the mercury causes it to adhere so closely to the grease, that it sometimes requires considerable boiling to separate it, and here we may have a slight loss by volatilization, and even with the utmost care, a trace may be washed away; but, after all, with moderate care, the results are near enough for practical purposes.

The relative density of mercurial ointment, or its specific gravity, although not usually alluded to, may also furnish valuable information, and, as it is a means often resorted to in detecting adulterations in other preparations, I determined to apply that test also in the examination of this ointment, especially as the most usual cause of inferiority is occasioned by an insufficient quantity of mercury being employed.

To prove the delicacy of the test, I made experiments with ointments of two different strengths; the one containing 50 grains of mercury in 100 grains of the preparation; the other containing 49 grains of mercury in 100 of the preparation. The specific gravity of each was taken, which, in the first instance, was 1.700, and in the second, 1.683, showing a differ-

ence of .017, where the difference of the mercury is but one grain in a hundred.

From actual trials with ointments made of various proportions of mercury and grease, the following table was formed:—

1	part	Mercury	to	10	parts	Grease	=	Sp. Grav.	.931
2	"	"	"	10	"	"	=	"	1.065
3	"	"	"	10	"	"	=	"	1.147
4	"	"	"	10	"	"	=	"	1.229
5	"	"	"	10	"	"	=	"	1.311
6	"	"	"	10	"	"	=	"	1.393
7	"	"	"	10	"	"	=	"	1.471
8	"	"	"	10	"	"	=	"	1.548
9	"	"	"	10	"	"	=	"	1.625
10	"	"	"	10	"	"	=	"	1.700

In taking the specific gravity of the ointment, the following precautions are necessary:

It should be carefully introduced into a 1000 grain bottle, so that the neck may not be soiled; about 100 grains will answer. After being warmed gently so as to melt the ointment, it is set aside to cool, by which it becomes solid and free from air. The exact amount of the ointment is then ascertained, the bottle being previously tared. After filling the bottle with water at 60° F., the weight of the contents is observed and the specific gravity calculated in the usual manner. As an example, suppose the ointment introduced is 80.5 grains, and, after filling the bottle with water, the total weight is 1028.5 grains. The water alone would then weigh  $1028.5 - 80.5 = 948$  grains; consequently the difference between this number and 1000 is the amount of water displaced, which is 52 grains; and the specific gravity is found by dividing the weight of the water into the weight of the ointment.  $80.5 \div 52 = 1.548$  is the specific gravity, and by reference to the table, we see it would contain eight parts of mercury to ten parts of grease.

I may here remark that, even in an ointment properly made, a slight discrepancy from the table may occur from using different proportions of lard and suet; but the variations from this cause are but slight.

In the course of the foregoing experiments, I had procured samples of mercurial ointment from various sources, both from

wholesale and retail houses. Without further specifying, I may be allowed to state that the ointments procured from Messrs. Powers & Weightman, and from C. Ellis, Son & Co., came fully up to the proportion of 50 per cent. The poorest sample contained but 10 per cent., others contained 15, 18, 25, etc. All these samples were purchased for, and represented to be, pure officinal articles; and it shows how necessary it is for the druggist to be careful, and fully understand the character of the preparations he may have occasion to purchase.

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#### THE PHYSICIAN'S PRESCRIPTION. TO WHOM DOES IT BELONG?

*Vicksburg, Miss., March 28th, 1866.*

Editor American Journal of Pharmacy:

*Dear Sir*:—I desire to present to your notice some views that have been engendered by the observation and careful study of the subject for the past year, as applying particularly to this section of the United States, namely: The ill effects of the renewal of prescriptions without the sanction of the Physician, and the best method of correcting the evil.

There *are hundreds* of recipes repeated that the Physician never authorized. When a Physician is called to see a patient, he writes his recipe, for which he is duly paid. *That fee* is tendered him for the medical knowledge and skill he supplies, as bearing on that *special case* of sickness. Now, when the patient has recovered, (through the beneficial effects of the medicine,) he has received his equivalent for money invested. Has that patient any right to use the recipe again for another attack of sickness? *I think not*; but *that* view only relates to the injustice done the Physician; now for the main point: The patients, (especially the poorer and more ignorant classes,) not only constantly repeat recipes without the sanction of the Physician, for *their own use*, but they will give it to other members of their own family, and, in numerous cases coming under my own knowledge, they *sell* the recipes to others of their acquaintance whom they fancy it will relieve, simply because it cured them. The constitutional effects of the same remedies in different temperaments

are well known to medical men, and what will cure one child will either have no good results or injure seriously another.

Take a case of a grown person, for example, who has been treated mercurially for syphilis; he may take from 10 to even 40 grains of iodide mercury in one-third grain doses without accomplishing the object of the Physician. He finally is cured, and having his accumulation of boxes and vials, he starts up in the "amateur speciality" business, and sells to his friends his boxes, with directions on them, (so as to *get even*, as one of our freedmen expressed it to me.)

The person who now holds the "amulet," tries the same quantity, and in about two weeks is ptyalized, and comes quarrelling with the dispenser, saying that the medicine was not compounded correctly.

I asked a white man, who had been steadily getting iodide of mercury in pills, and after that iodide potassium and sarsaparilla, why it was that he was not well. Oh! says he, I have been all right for two months, and *these* are for my partner, who is down with the same disease.

The entire system is wrong, and, as it is a growing evil, something should be done to check it, either by Legislative enactment or by preconcerted action of Pharmaceutists and Physicians. Thus, let no Apothecary renew a recipe, except under the signature of the Physician ordering it.

Please give the subject some attention.

Very truly, yours,

W. P. C.

[NOTE.—The subject of this letter is an old one, and upon which neither Physicians nor Apothecaries agree sufficiently to induce any general action. In the first place, the constant habit of many Physicians is opposed to the wish of the writer. They direct their patients verbally to get prescriptions renewed, and many know that their prescriptions are used habitually as family medicines by their patients, and don't object.

Other Physicians are directly opposed to this course, and in some instances, on a printed blank, direct the Apothecary not to renew the prescription without written directions from the prescriber. Pharmacy in England and France is older than in the United States, and in those countries when a Physician writes a prescription and hands it to the patient, it becomes his property after the fee is paid, in evidence of which the Pharmaceutist returns it to him after copying. This is the view gene-

rally taken by the *people* of this country, and our College of Pharmacy, while it urges that the Apothecary should keep the original prescription as his guarantee in case of error by the prescriber, does not even by inference withhold a copy from the patient. The number thus copied is quite small compared to the whole number, being the exception and not the rule. If, then, the patient has a right to the prescription, by inference he has a right to use it, but at his own risk; and until Physicians attempt to invalidate this right by a unity of action among themselves and with Pharmaceutists, by considering each prescription as a sort of patent granted for a special case, and cause this to be supported by Legislative action, we cannot see that the views of our correspondent could be carried out. We agree with him, however, that harm may be and is done, but, on the other hand, much benefit may arise in cases where the Physician may be absent. The main difficulty is *that* pictured by our correspondent, where the prescription is used as a source of pecuniary profit, under circumstances calculated to do mischief, and certainly never intended by either Physician or Apothecary. Any action in this matter should be based on the general interests of medicine and the community at large, and be the result of deliberation.—ED. AM. JOURN. PHARM.]

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#### ON THE PURGATIVE CONVULVULACEÆ.

BY M. ANDOUARD.

This paper, as it appears in the *Journal de Pharmacie* for February, 1866, page 107, is a report by M. Marais on a thesis sustained by the author before the Société de Pharmacie de Paris.

We know, at this time, two kinds of jalap: *Exogonium purga*, which is the officinal jalap; and *Ipomea orizabensis*, which is designated in Mexico under the name of male jalap, and which we know under that of fusiform.

These two plants, very different in a botanical point of view, and very different, also, in the aspect and composition of their roots, are common in Mexico, where, according to M. Mendez, cited by M. Andouard, they are found always together. The collection of jalap is made immediately after the rainy season in May. The roots are cleansed and deprived of their stalks which accompany them from the mountains. At this time, they are brown externally, and yellowish within, gorged with a milky juice. They are afterwards dried in the sun, or more frequently by direct heat of a fire, which has the inconvenience of causing some of the resinous matter to exude, and of giving the root a blackish brown appearance.



Several facts are presented of a novel character, that were derived from M. Boucard, a young naturalist, who spent several consecutive years in Mexico.

It was known that jalap grew spontaneously in the environs of Xalapa, and in the principal Sierra within a certain zone of its altitude, varying from 1,500 to 2,000 metres above the level of the sea; but what was previously unknown is that this altitude is necessary to the vegetation and complete development of true jalap. They have sought to acclimate it to the lower height of the plateau of Xalapa, and have planted it particularly at Huatusco; but these attempts have not given satisfactory results.

According to the observations of M.M. Boucard and Mendez, jalap grows by preference in the mountains, in cool and moist places. The most beautiful individuals were encountered in a porous light soil, shaded by a forest of pines and oaks; and whenever a place of suitable altitude occurs where a torrent descends, jalap is certain to be found on its borders, sheltered from the sun.

Besides the two jalaps which have been noticed here and are in commerce, M. Andouard has observed a third sort, called Tampico, but in truth of unknown origin. To these three sorts, it is necessary to add a fourth, recently introduced into France, and which M. Guibourt has provisionally called digitate.

These different species of jalap are very far from having the same value, that is to say, the same content of resin. In taking tuberos or officinal jalap of good quality as a type, we find it contains from 16 to 17 per cent. of resin, and that male jalap of Ledanois, or fusiform jalap contains from 9 to 10 per cent., according to Ledanois himself, following our best authors, and according to the repeated and varied essays of the Commission. M. Andouard, on his side, alleges the proportions of from 14 to 20 per cent.—more than in the tuberos jalap—whence he believes that he is able to conclude that the therapeutic value of these two jalaps, tuberos and fusiform, is at least equal.

M. Marais regards this affirmation as premature after he examines the results of other experimenters, and considers it dangerous, because it furnishes a pretext for substitutions and

falsifications which are practised but too easily. • Do we not, in fact, see fusiform jalap sold daily, to the exclusion of true jalap, under the false name of “jalap stalks,” and afterwards, fusiform jalap itself held in check by this new arrival of large finger jalap, which contains but two per cent. of resin.

The committee represented by M. Marais regret that a sample of the fusiform jalap, examined by the author of the thesis, had not been sent to them, and which had produced such an unprecedented yield of resin.

*Table of the Comparative Quantities of Resin yielded by Different Varieties of Jalap :—*

	M. Andouard. Per cent.	Committee. Per cent.
Jalap—Tuberous or Official ( <i>Exogonium purga</i> )	12 to 14	16 to 17
“ Fusiform ( <i>Ipomea orizabensis</i> ) . . . . .	10, 14 to 20	9 to 10
“ Tampico . . . . .	4 to 5	3 to 4
“ Large Finger ( <i>digité</i> ) . . . . .		1·5 to 2
“ Small Finger . . . . .		2 to 3
“ Black, rec'd. by way of Vera Cruz, (origin unknown) . . . . .		8 to 10

In regard to the discrepancies in these results, M. Marais doubts the similarity of the tuberous and fusiform jalap examined; and, besides, believes that a variation in the mode of extracting the resin must have occurred, and then puts the question whether, in equal doses, these resins have the same purgative property. M. Andouard says “yes,” for the two principal kinds at least. The Committee have not been able to fully respond to this question, as the specimens placed in the hands of several hospital physicians could not be used, owing to the epidemic cholera prevailing. They can say, however, that one of the members took the resins in doses of 25 to 40 centigrams, ( $3\frac{1}{2}$  to  $5\frac{1}{2}$  grains), and found the effect of the tuberous jalap to that of the fusiform in the ratio of 5 to 3. The resins of the other varieties were not tried.

#### SCAMMONY.

M. Marais says that this part of the thesis did not offer much that is new, regrets that M. Andouard has not been in a position to prosecute his researches more closely into the value of the varieties of scammony, and hopes that he will have the heart to take hold of the task with so good an object in view.

The author disapproves of the English plan of extracting the resin from the dried roots of the scammony plant, because it is not accompanied by gum and odor, as is the natural exudation; but this remark certainly will not apply to the resin of scammony made from scammony itself. M. Marais thinks that, in a drug where 70 to 75 per cent. is active matter, there is little need to extract the resin; and that a long experience proves that good scammony is sufficiently well marked to be recognized, even if there were no other characters than the five that M. Dubail has designated. A good scammony should be grey, light, friable, lactescent and odorant. [The experience in this country goes to prove that commercial scammony cannot be relied upon, and hence the U. S. Pharmacopœia directs the resin itself in compound extract of colocynth.]

#### THE ROOT OF TURBITH.

The observations on turbith are more substantial than those on scammony, but the subject is of less importance. We think, with M. Andouard, that this root is a good purgative, that it offers the advantage of being easily managed, and, further, that it is very abundant, as, according to M. Lepine, it grows wild in the forests near Pondichéry; but, notwithstanding its qualities and abundance, it is to be feared that the indifference of physicians to its use will not be changed. M. Andouard has not hesitated to experiment on a number of samples, of which the mean value of the resin was 10 per cent. This richness in active matter is sufficient to class turbith, in therapeutic value, with jalap at 16 per cent., and scammony at 75 per cent. of resin. The following is his analysis of turbith root, which is the most complete extant: Water, 3.60; Resin, 10.20; Gum and Albumen, 7.20; Starch, 12.35; Sugar, 0.51; Lignin, 52.70; Mineral Salts, 9.80; Loss, 3.64.

The Méchœcan and the roots of indigenous bind-weeds are only mentioned to complete the collection of purgative convulvulacea.

#### CONCLUSIONS.

The thesis of M. Andouard is very substantial, and of great interest for Pharmacy. The most important point of interest is.

that relative to the influence of altitude, temperature and soil on the spontaneous development of the true jalap. But, in reference to the exaltation of the value of fusiform jalap, M. Marais believes it premature, and that such results should only be recognized after new and thorough analytical essays and therapeutic trials. On the whole, however, the Committee consider the thesis of M. Andouard, in the arrangement of its several parts, and in the compilation of the whole, exhibits a practiced hand beyond that of a beginner, and which, they hope, will yet render more than one service to Pharmacy.

In consequence of this report, the "Société de Pharmacie de Paris" has decided that the author has merited the thesis prize for the year 1865, and expresses its satisfaction with his labors, hoping they will prove an encouragement to young men to prosecute the study of the natural sciences, too much neglected at this time.

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#### NOTE ON OLEORESINA CUBEÆ.

BY WILLIAM PROCTER, JR.

The purpose of this note is two-fold,—to point out an imperfection that occurs in some of the commercial specimens, and which materially injures the value of the preparation, and to offer a few remarks in reference to its manufacture. By the officinal process the powdered cubebs is exhausted by percolation with ether, that is to say, for every 12 troyounces of cubebs 24 fluidounces of percolate is obtained. The percolate is then made to yield eighteen fluidounces of ether, by means of a water-bath still and a good refrigeratory, after which the residue is exposed in a capsule until the remaining ether has evaporated. It will be proper to remark, by way of illustration, that cubebs contain volatile oil, soft resin, cubebin and waxy matter, that are soluble in ether, and all of these, except the latter, are more or less active. When carefully made, oleoresin of cubebs has a dark green color, varying from dull green to deep grass green, according to the condition of the cubebs treated, that is to say, according as the berries contain more or less chlorophylle, due to their greater or less ripeness when collected. The specific gravity of the oleoresin is not uniform, owing to the variable propor-

tion of volatile oil in cubebs, and to its more or less perfect freedom from the last portions of the menstruum used; and this brings me to the imperfection alluded to in the beginning of this note. It has repeatedly occurred that the oleoresin purchased of druggists has a decided ethereal odor, is quite thin in consistence, and sometimes has a considerable quantity of crystals of cubebin in a separate state, either floating in the liquid or adhering to the sides and bottom of the phial. Now, the presence of ether is objectionable as a dilutant, as facilitating the crystallization and separation of the cubebin by thinning the oleoresin, and lastly, from altering its medical properties; and the apothecary should either return the preparation as imperfect, or, submitting to the loss, expose it in a capsule until the ether evaporates. One specimen, bought as genuine, when thus treated, lost three-eighths of its weight by spontaneous evaporation in a short time! As regards the separation of the waxy matter and cubebin, the former tends to deposit first, and the cubebin afterwards, with more of the wax. This occurs in the most carefully prepared specimens, but the separation occurs more slowly when the concentration is perfected at once in a distillatory apparatus with a regulated heat, than by gradual spontaneous evaporation. The high price of ether has suggested the idea of using other and cheaper solvents, as alcohol, bisulphuret of carbon and benzole; and I have recently tried the purest commercial "benzine," which, when dropped on paper, left no odor after a few moments exposure to the air, and, so far as the quality of the preparation is concerned, it affords an excellent preparation, less disposed to deposit than either the alcoholic or ethereal oleoresin. The product is greatest by alcohol, owing to the removal of more extractive matter probably.

The following results were obtained with ordinary ether of commerce, sp. gr. .750, with stronger alcohol that had been shaken with carbonate of potassa, and with good benzine of sp. gr. .705. In each experiment 1000 grains of cubebs was packed closely in a conical percolator arranged for volatile fluids, and the several menstrua poured on until the bulk of 1000 grains of water at 60° F. was obtained; the receivers were then changed, and the percolations continued until an equal additional quantity of percolate from each was obtained; the specific gravity of the several first liquids was then taken, and afterwards each of them

evaporated in a warm place till they ceased to lose weight. The second liquids were then evaporated. The results are exhibited in the following tabular view :

Cubebs treated.	Menstruum used.	Quantity of 1st percolate in grain measures.	Oleoresin yielded.	Quantity of 2d percolate	Oleoresin yielded.	Total oleoresin.	Percentage.
1000 grs.	Ether.	1000	205	1000	14	219	21·9
1000 grs.	Alcohol.	1000	240	1000	30	250	25·0
1000 grs.	Benzine.	1000	140	2000	25	170	16·5

The products by alcohol and ether were both cloudy, from a portion of deposited matter, whilst that by benzine remained clear and free from deposit. The specific gravity of these products varied ; that from benzine was ·9325, that by ether ·9675, that by alcohol ·9850 ; whilst the commercial sample alluded to as containing ether, was only ·9000, with a deposit of cubebin in the vial. The trials were at the temperature of 76° F. To determine whether the benzinic dregs contained matter soluble in ether, a portion of the latter was poured on the dregs until the absorbed benzine was displaced, when the percolation with ether was continued until 1000 grains had passed. It had a green color, and on evaporation yielded a residue of 28 grains, consisting chiefly of cubebin, with a little waxy matter and chlorophylle, but no volatile oil, and but little pungent resin. Cubebin appears to be but slightly soluble in benzine, and until it be settled that it has no medicinal virtue, it will not do to employ benzine as a solvent in making oleoresin of cubebs.

From these results it is apparent that nearly the whole of the oleoresin is removed in the first percolate, and that 1000 grains measures of ether in the second only produced one-fourteenth as much of oleoresin. As this applies equally to all, it points to the propriety of stopping the percolation earlier, and sacrificing the little oleoresin left in the dregs.

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#### CHEMICAL RESEARCHES ON THE MYRTLE OF AUSTRALIA—*EUGENIA (JAMBOSA) AUSTRALIS*.

By MM. DE LUCA AND UBALDINI.

This tree, which grows admirably in the open air, and with no care for culture, in the Botanical Garden of Naples, attains the height of about forty feet. Its straight and cylindrical

trunk gives rise to numerous branches, which bear an abundance of deep green elongated persistent leaves. At the extremity of the young branches, and at the insertion of the leaves, appear whitish flowers, to which succeed pendant fruit, of a beautiful violet red, about the size of cherries, but of an elongated form, and an agreeable, slightly sweet and acidulous taste.

The tree, during nearly six months of the year, (from November to March,) is covered almost continuously with flowers and fruit—a rare thing in our country [Italy].

The juice obtained by expression is of a beautiful violet red; its taste is very agreeable and slightly acid; by concentration and repose, it deposits, among other things, a crystalline substance which is cream of tartar; this juice, which contains glucose, ferments at the ordinary temperature with the disengagement of  $\text{CO}^2$  and the production of alcohol, which may be obtained from it by distillation.

The coloring matter of the fruit of the Australian myrtle is very soluble in water and alcohol, and yet better in a mixture of alcohol and ether, although it does not dissolve in pure ether. Purified animal black retains this coloring matter as it does that of must or red wine.

The action of the air and of fermentation changes the violet red color of the juice to vinous red; the ordinary acids redden it, and the alkalis give a beautiful green tint. Paper colored by the juice, preserved from contact with the air, will act well as test paper for acids and alkalis.

Reducing agents, such as alcoholic ether, sulphohydric acid, or, better, nascent hydrogen, decolorize the juice of the fruit of the myrtle, but afterwards, when exposed to the air, it regains its primitive color.

The coloring matter of wine or that of tournsol comports itself with nascent hydrogen in a similar manner.

Red wine and the juice of the Australian myrtle are precipitated by acetate of lead; these colored precipitates, when they are decomposed by diluted chlorohydric acid in the presence of ether, afford a white precipitate of chloride of lead, beneath two distinct layers of liquid; the lower being water containing the coloring matter; the upper, colorless ether.

The juice of the fruit of the myrtle of Australia, after fer-

mentation, that is to say, *myrtle wine*, acquires by time a peculiar ethereal, very agreeable odor, which is the *boquet* of the wine. The same juice, not fermented, gives by evaporation a syrupy sweet substance like that from grape juice.

Myrtle wine, when evaporated to a tenth part, and allowed to repose during twenty-four hours, deposits crystals of cream of tartar. This same wine, agitated with double its volume of a mixture of ether and ordinary alcohol in equal parts, deposits little crystals of cream of tartar on the sides of a matrass, well stopped, after twenty-four hours repose.

Lastly, this wine, besides cream of tartar, contains free tartaric acid, which can be precipitated by alcoholic ether, after transformation into cream of tartar, by adding a little potassa.

All these experiments show a close relationship between the fruit of the grape and that of this myrtle of Australia.

The myrtle indigenous to Sicily, bearing small white fruit which contains cream of tartar and free tartaric acid, also will yield wine.—*Jour. de Pharmacie*, Jan., 1866. W. P., Jr.

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EXTRACT OF HEMLOCK BARK (*ABIES CANADENSIS*)—  
A NEW AND VERY CHEAP ASTRINGENT.

By N. SPENCER THOMAS.

MR. EDITOR:—Having become extensively engaged in the manufacture of Extract of Hemlock Bark “evaporated in vacuo” for tanning leather, I have frequently observed a very great similarity between it and the Extract of Rhatany, of which I used to make large quantities, both for my own sales and for other parties. The Extract of Hemlock seems to have exactly the same appearance, both before and after drying, as the Extract of Rhatany. As far as I know, it has no other properties about it than the astringency of the tannic acid. I should suppose it would answer all the purposes for which Extract of Rhatany is used in medicine and for the purposes of dyeing its own natural tan color, and black, and also for making ink. As it is the cheapest form in which tannic acid can be purchased, it will undoubtedly be applied to many useful purposes when it becomes known. As I am under the impression that



this article may become a valuable addition to the "Materia Medica," I take this method of bringing it to the notice of those interested. In manufacturing this article, the evaporation is performed in "vacuo," and our customers, who use the article in tanning, have repeatedly tried our make in comparison with an article made by open evaporation, and they willingly pay us from 50 to 100 per cent. more for ours than they can buy the article made in open evaporation. This proves conclusively the great merit of the vacuum pan in making solid extracts, or for most kinds of evaporation.

We are now selling this extract at ten cents per pound, delivered at the depot, here, in boxes of 170 lbs., and will send a single box to any druggist that may want one. Small or large quantities can be obtained from Mr. Iredell, at No. 120 Exchange St., Philadelphia, at a small advance on the above price. This article is a pure extract of the bark of the hemlock tree, or *Abies Canadensis*, and should not be confounded with the other hemlock, or conium, as it has none of its properties, but is a pure astringent.

N. SPENCER THOMAS.

*Painted Post, New York, April, 1866.*

## MANUFACTURE OF COD LIVER OIL IN NORWAY.

BY J. LEON SOUBEIRAN.

Having been charged in the month of August last by the Zoological Acclimatation Society to go to Bergen, in Norway, to study the exhibition of fish which was to be held there, I have received some information on the manufacture of cod liver oil, which I believe offers sufficient interest to the pharmacist for me to make it known.

Until latter years the cod liver oil of commerce was obtained by the crude process of fermentation or putrefaction, the livers being thrown into barrels, and abandoned to themselves until the oil separated and arose to the surface, whence it was removed for use. Thus obtained, it is always colored brown, and has a repulsive taste. The idea of heating the livers to extract the oil is of comparatively recent origin. This process, as applied

in Norway by small manufacturers, is carried out by conducting the steam from a cylindrical boiler by several pipes into as many barrels containing the livers, each furnished with stop-cocks at different heights. As the steam operates, the lighter colored oil separates and rises to the top, and should be drawn off as soon after it separates as possible. The oil obtained afterwards is more colored and odorous, and it is thought that the solvent action of the steam extracts such substances as iodine and bromine compounds from the oil, and thus injures it.

To obviate this inconvenience, most of the regularly organized factories in Norway have an apparatus consisting of a vessel surrounded by a steam jacket, so arranged that the oil can filter off in measure as it separates, which is considered to be a great improvement. This apparatus consists of a cylindrical vessel enclosing another cylindrical vessel of smaller diameter and less height, joined steam-tight to the first by a rim at the top. The inner vessel has a conical diaphragm, dividing it into two parts, which diaphragm is constructed of some material which acts as a filter, admitting the oil to flow into the lower apartment, whence it is drawn off by a stop-cock, passing latterly through the steam chamber. This arrangement answers a good purpose.

We saw at Bergen an apparatus made by one of our pharmacutists, M. Bouilly, which has appeared the simplest and most convenient of all. This consists of a cast-iron boiler, so arranged that a large curved tube passing through it constitutes part of the chimney of the furnace which heats it. From the top of this boiler four pipes convey the steam to four jacketed conical boilers, each capable of holding three or four barrels. The livers are placed in these, duly disintegrated, and as the oil separates it is removed at once into a large vessel called a *Kyler*, to cool. During its cooling it becomes clear, forms an abundant deposit from which the oil is decanted and preserved in tinned iron vessels, which are preferable to wooden barrels, which sometimes give color to the *very white oil* obtained at the commencement of the process.

When the livers are thus exhausted of the white oil, they are removed to a large boiler and heated by a regulated direct heat, until much of the oil remaining separates as a *blonde oil*,

much used by the Norwegians for illumination. The residue is yet further treated to get a brown oil, used in the arts, whilst the final residue, of a resin-like matter, is used by the farmers as a manure.—*Journ. de Pharm., March, 1866.*

W. P., JR.

#### NOTE ON RECTIFIED OIL OF AMBER AS A REMEDY FOR HÆMORRHOIDS.

BY WILLIAM PROCTER, JR.

Of the large number of persons who suffer from this annoying complaint, very many never consult a physician, and many others after renewed treatment give up the idea of becoming cured, viewing the affliction like some do old ulcers, as a burden to be borne while life continues. Various external applications are constantly prescribed, as an ointment of acetate of lead, tannin or nutgall, and opium, which is often successful in affording relief. Numerous secret nostrums have, from time to time, attracted attention, indicating the prevalence of the disease. Several years ago my curiosity was excited by the repeated calls for rectified oil of amber by a person who was not in any way connected with medicine, and he was asked the use to which it was applied. He said it was for piles, and that he rarely knew it to fail, the numerous calls that had been made being for friends and acquaintances who were sufferers from the complaint. After that, on several occasions where opportunity offered, it was suggested and tried with success, in many cases of piles where the tumors were external and annoying. The manner of its curative action I am not aware of. The oil is applied as a lotion to the tumours, and around the anus where the swellings exist. It occasions a smarting sensation at first, but after several applications the sensitiveness disappears, and the tumours are dissipated. So far as is known to the writer the influence is entirely local, and does not extend beyond the parts to which it is applied. I am not aware that it has been applied beyond the sphincter ani to the internal tumors, but know of a case wherein both internal and external piles existed, the latter disappearing, and the others continuing to give annoyance. The object of this note is to ask the attention of medical men to the subject, that the ac-

tual value of the oil of amber as a remedy for piles may be satisfactorily tested. It may be that in some cases admixture with lard or cerate would be preferable, and in the form of an emulsion, or associated with glycerin or olive oil, it might be applied in the rectum by injection or by a bougie. These are mere suggestions to the physician.

It is to be regretted that so little genuine oil of amber is to be obtained, as has been conclusively shown by Mr. Ebert, of Chicago, (see page 146 of this volume,) who finds that it costs as much per ounce to make the oil as it sells for in commerce per pound. Failures may be attributed to the spurious oil made from turpentine and coal oil, shaken with oil of tar and some oil of amber.

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#### A COMPARISON OF DR. SQUIBB'S PLAN FOR ECONOMIZING ALCOHOL AND N. SPENCER THOMAS'S PATENTED PROCESS FOR MAKING FLUID EXTRACTS.

BY N. SPENCER THOMAS.

When an article on Fluid Extracts was published in the March, 1865, number of the Journal, the Editor suggested that, as the process was new, it would be well for the inventor to submit his process, as early as practicable, to a committee of Pharmacutists, that its merits might be tested. This was done as far as could be on my part, but no action by a committee could be had, although more than a year has elapsed; and, as I have been closely engaged in business away from the city, I have only recently seen Dr. Squibb's remarks about my process, in May, 1865, number of the Journal, and his proposed plan for saving alcohol, in the March, 1866, number. I could see, on reading his remarks about my process, that he did not properly understand it; as he says it will do for some drugs and not for others, naming some of those which he would put into each list. Some of the drugs which he thinks it will not do for, are the very ones it does for to the greatest perfection; or, rather, for which the advantages of the plan are most striking. I claim and believe—in fact, I may say I know—it is perfection for all drugs. It is more simply and easily applied—that is to say, can be properly applied by a less skilful person—than either

the Pharmacopœia process or Dr. Squibb's method, and will produce more regular and uniform results than either. Dr. Squibb is also wrong in so publicly questioning the validity of my patent, as his instance given, where he had used, as he says, the same process, happens to have been in making a solid, and not a fluid extract.

My patent is only on my particular process for making Fluid Extracts, by means of which the object is accomplished, and heat, evaporation and prolonged exposure to air are all avoided. I do not claim a press, or the use of a press—it happens that the process cannot be carried out without using a powerful press, but any sufficiently powerful press can be used. The plan or process consists in merely moistening the properly ground drug with three-fourths of its weight of menstruum, allowing it to stand a few hours, then submitting it to a very powerful pressure, then breaking up the cake, and adding the remaining one-fourth of its weight of menstruum, and, after thoroughly incorporating the fluid with the drug, again submitting it to the same pressure; this, with the first pressing, can be weighed or measured, and, by subtracting this amount from the amount of finished extract required, gives the amount of liquid yet to be applied to the drug, to make the required amount of finished extract, and can all be applied for a third pressing, or be divided for a third and fourth pressing; when these various pressings are mixed, the extract is finished.

Presses can now be furnished for two hundred and twenty-five dollars, capable of effectually carrying out this process; and I am now granting individual rights to use the process for a small patent fee on each pound of extract, when made. By this plan, no investment is required in advance for patent fee, and only two hundred and twenty-five dollars for apparatus, as nothing is required but the press. The matter has been neglected for over a year, because I did not suppose it could be carried out at an outlay of less than two or three times the amount of money; but, by reducing the size without reducing the power of the press, and putting the patent fee in the form of royalty, almost every apothecary is enabled to avail himself of the advantages of this process. The fee will be less than the actual saving of

alcohol over any other process, after the investment is made in the press, which is always worth the money it costs. The Fluid Extracts can be made cheaper and a great deal better by this than by any other process. I adopted and used this process extensively before the advance in price of alcohol. The saving is, of course, much greater since the great advance in the price of that article.

In comparing the two plans, Dr. Squibb's has the preference in one point, that is, it can be carried out with a much cheaper apparatus than mine can; but, with the necessary press, my plan will produce a much more definite result, and will save menstruum, time and drug, and can be carried out by a less skilful hand than either Dr. Squibb's or the Pharmacopœia plan. It is very evident, from a study of the Pharmacopœia, and also from a study of Dr. Squibb's and other articles on the Fluid Extracts, that the effort, all the way through, is to accomplish exactly what my process does effectually accomplish. The whole effort or aim, in almost every formula in the Pharmacopœia, is to avoid heat and evaporation, as shown by reserving, in most cases, three-fourths of the amount to which neither is applied. The Pharmacopœia formulæ are right as far as they can go right, which is just three-fourths of the way—at least, apparently so—that is to say, they would be right, if the remaining one-fourth could go on in anything like same ratio; but it cannot; therefore, the imperfect plan adopted by the Pharmacopœia for obtaining the last one-fourth was the best plan then known. The first three-fourths obtained by my process will contain much more of the whole strength of the drug than the first three-fourths obtained by displacement; this leaves the last fourth, in my case, capable to practically take out all the remaining strength of the drug, which cannot be done by displacement.

Dr. Squibb's plan goes apparently right farther than the Pharmacopœia; but, as it goes on precisely the same plan—that is to say, a plan of which he says, himself, that no reasonable continuation will absolutely exhaust the substance of soluble matters or of the alkaloids—it seems to me that any better plan should be adopted in preference. Dr. Squibb's plan is extrava-

gant where high-priced drugs are operated on. It would be good for low-priced drugs, if the proper stopping-point could be known in each individual operation; but, in addition to varying with each drug, there would be a great variation in the same drug with each different operation; a very slight variation in strength of menstruum, temperature, time; shape of percolator, fineness of drug, amount of moisture applied before putting into percolator, slight variation in pressing it into percolator, and, perhaps, some other points would make so much variation, that it would be entirely unsafe to adopt any such plan, of which, I believe, the Doctor himself is satisfied. It is true that some of the same influences enumerated above may act so as to vary slightly the result of an operation by my plan; but, under reasonably favorable circumstances, and with any moderate degree of care in following out my directions about the process, and with a proper solvent or menstruum, the result must be very close to the proper point of exhaustion.

A very important part of my process is to keep the menstruum of same strength all the way through each individual lot or operation. This I conceive to be a very important matter in exhausting the strength as well for preventing precipitation when the different liquids are mixed at the end of process. There has been—and very properly, too—a great deal said about the impropriety of deviating from the standard formula, even though it be an improvement. I would ask the question whether, when we can read almost as plainly as if it were printed in the formulæ, that the formulæ is an attempt to make sixteen ounces out of sixteen ounces, but stops at twelve ounces, and then does the best it can with the other four—whether there is any good reason why, if a practicable plan for making the last four ounces in such a manner as to practically carry out the same idea as is applied to the first twelve ounces, it should not be adopted. I fully agree with the greatest sticklers for standard that no deviation should be made from the standard that in any way lessens or injures the quality; though I have found there are very few apothecaries or druggists carrying out the formulæ of the Pharmacopœia now, in the making of the

Fluid Extracts; nearly all have some way of their own of cheapening them, particularly the large operators.

Dr. Squibb's paper gives many valuable suggestions which are really in favor of my process. He arrives at the fact that the medicinal virtues are easiest soluble; this is certainly in favor of a plan using so small an amount of menstruum as mine. He speaks of the amount of alcohol directed for moistening the drug previous to displacement affecting the operation very materially, and the amount directed by the Pharmacopœia not being the best quantity. This shows how small a matter may affect the result by displacement in the hands of an unskilful operator. He also speaks of the trouble in some cases by impaction; this trouble there is no provision against, and with an unskilful operator would very seriously affect the result. This difficulty cannot occur with my plan. He speaks of the point of absolute exhaustion never being attained in displacing. This can be attained much quicker by my plan than by any other. By pressure, as I propose, we have all the advantages of displacement without any of its disadvantages. The menstruum with which the drug is first moistened, being about the same either for displacing or pressing, I believe that if pressed out it carries with it a much larger amount of solid extract than if displaced out. Then the second addition, having a weaker drug to operate on, I think carries its strength out more perfectly than if displaced. If we divide each operation into fourths, the first fourth pressed will be much stronger than first fourth displaced; and from this fact, when we come to the last fourth, we have a much better chance to clean out all that is left by pressing than by displacing, as the action of the press is much more definite or positive than percolation.\* In what little conversation I have recently had

\*[This *appears* to be mere assertion, as does much that the author states in reference to the exhaustion of drugs by pressure, in the absence of actual results. What we want, and what we have always had, when any great innovation, like percolation, has been introduced, is a tabular statement of actual careful trials, made in a truthful spirit. Let us have the solid contents of each fourth compared with the same by percolation. Our *own opinion*, in the absence of actual comparative trial, is that the first percolate will be denser than the first pressed liquor, whatever may be true



with druggists, I find some of them are prejudiced against pressing, and very much in favor of percolation; this comes from the fact that they have worked with good displacers, but with very inferior presses. The press I have been using has all the latest and best improvements, and is so arranged that the substance being pressed is readily removed and readily parts with its liquid whilst under pressure, while most presses used by druggists are very weak and poorly arranged affairs.

For making solid extracts, a most perfect preparation and a stronger extract can be made by evaporating a fluid extract made by my process than can be made by any other plan. Druggists adopting my plan for making fluid extracts can always make a solid extract at very short notice by evaporating the fluid extract to a solid, and have a most reliable article, if the very small amount of evaporation necessary is carefully conducted. Solid extracts made in this way will be stronger than made in any other way, because of the very small amount of menstruum used; the inert parts of the drug are not so readily dissolved out as the medicinal parts are, especially if the solvent or menstruum used be exactly right. When a revision of the Pharmacopœia is made, I would suggest to the revisors that, as far as practicable, for the sake of uniformity, the fluid extracts be made without sugar, except in cases where a small quantity could be advantageously used as a solvent or assistant solvent, and that they be made with the lowest amount of alcohol consistent with preservation, using alkali, glycerine, sugar or any other substances that would assist in dissolving and holding in solution the medical

of the subsequent portions, because the first stratum of liquid that descends in a well arranged percolator exerts its action consecutively upon each stratum of the drug, until it becomes saturated. We all have percolators, but very few of us presses of the capacity necessary to work out the problem. It is therefore highly proper that the author of the process himself, furnished as he is with the means, should make these experimental trials, and offer them as the basis of his opinions, for others to substantiate or refute,—and not come forward with mere assertions, without, so far as we can judge, any therapeutic trials, or any analyses or evaporations to decide the actual merits of the process.

The reception of this paper just as we were going to press, prevents our accompanying it by a more detailed and explicit commentary.—*Ed. A.M.J.P.H.*]

virtue of the drug, the same solvent being necessary to hold in solution that is required to properly extract the virtues, and vice versa, that is to say, just the same solvent is necessary to dissolve out the virtues of a drug that is required to hold the same permanently in solution. For the small quantities wanted by retail druggists, a powerful press of small dimensions can be made for about one hundred dollars, capable of fully extracting by my process the full virtues of any drug. So if the revisors of the Pharmacopœia should on investigation satisfy themselves of the superiority of my plan over all others, there would be no reason why pharmacutists should not be expected to incur so reasonable an amount of expense for the sake of carrying out properly the best process for making so valuable a class of preparations, as I now propose to grant to any druggist or apothecary individual rights to use my process on agreeing to pay a small fee on each pound of the fluid extract when made. There is no obstacle in the way of its general adoption, except the mere cost of a suitable press, which is now, for moderate quantities, two hundred and twenty-five dollars, and for small quantities the cost will probably be about one hundred dollars. In applying this process, when I claim that it is entirely practicable for all the different drugs in the list of *Materia Medica*, I, of course, would have it understood that the solvent or menstruum must in all cases be the proper one; and that is a matter that the operator must understand. If operating on substances for which there is no standard authority, the process is perfection; but, of course, if the menstruum be not the proper one according to the nature of the drug, the preparation will not be perfect; but if the solvent used be capable of holding the virtues of the drug in solution, there can be no question about its ability to dissolve it out by my mode of applying it, while the same liquid merely running through will not and cannot be expected to so thoroughly and quickly dissolve out the virtues, particularly if any of the particles of the drug happen to be a little too coarse, which, under the action of powerful pressure, will have the virtues removed from the centre of the particle that would be passed by or missed by a percolating liquid not under pressure.

## ON THE ADULTERATION OF SAFFRON WITH THE STAMENS OF CROCUS.

BY ROBERT BENTLEY, F.L.S., M.R.C.S. ENG.,

(Professor of Materia Medica and Botany to the Pharmaceutical Society of Great Britain, etc.)

Saffron must necessarily be dear, in consequence of so small a portion of the flower of the plant (*Crocus sativus*) from which it is derived, entering into its composition. It has been computed that upwards of 60,000 flowers are required to form a pound of saffron. For this cause, also, saffron has always been liable to frequent and great adulteration. The substances that have been most frequently employed for its adulteration are the florets of the safflower plant (*Carthamus tinctorius*.) and those of the common garden marigold (*Calendula officinalis*.) The former plant, indeed, has received the name of *bastard saffron*; and according

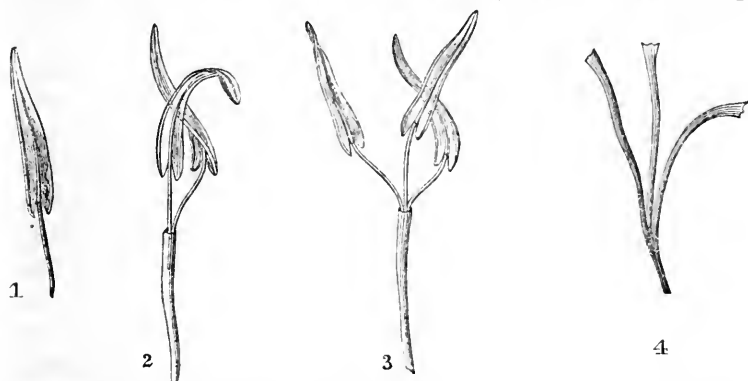


Fig. 1. Stamen of *Crocus*, somewhat enlarged in order to exhibit more distinctly its characteristics.

Fig. 2. A part of the tubular portion of the perianth of *Crocus*, bearing two stamens.

Fig. 3. The same as Fig. 2, except that three stamens are inserted on the inside of the tubular portion.

Fig. 4. The upper end of the style, with the three stigmas, of *Crocus sativus*, which together form genuine saffron.

to Pereira, and his observations have recently been confirmed by myself, the so-called Cake Saffron of the shops, which was formerly obtained by submitting the ordinary hay or officinal saffron to pressure, is now commonly prepared from safflower florets, made with mucilage into a kind of paste, which is afterwards rolled out into cakes. Other adulterations of saffron that have

been more especially noticed are, the petals of soapwort (*Saponaria officinalis*,) the flowers of arnica (*Arnica montana*,) and the flowers of a species of *Pulicaria*. Fibres of smoked beef, it is said, have also been employed for adulterating saffron, and other foreign substances have been likewise occasionally detected in different specimens of this drug. Saffron, again, from which the color has been extracted has been used to adulterate genuine saffron. The intermixture with, or substitution of, the florets or petals of other plants with the genuine drug may be readily detected in many ways, but the plan commonly adopted is by examining the suspected portion, after maceration in boiling water, with a magnifying glass. A much simpler and better plan is to macerate some of the suspected saffron for a few minutes in boiling water, and then to take out a few separate pieces of the infused mass, and diffuse them by means of a stirring-rod in a glass of cold water; the vessel being then held up to the light, the short upper end of the style with its three attached linear stigmas, with their expanded somewhat wedge-shaped notched extremities (Fig. 4, p. 225,) and the more or less separated loose stigmas, which together constitute true saffron, may be at once distinguished from the tubular or flattened florets or petals of other plants, if these latter have been used as adulterants of, or substitutions for, genuine saffron.

The subject of the adulterations of saffron has recently been brought especially under my notice, in consequence of a specimen of saffron supposed to be adulterated having been forwarded to this Society for examination from a wholesale house in the City. From inquiries made afterwards, I found that a sample of this saffron was offered for sale by two Spaniards, who came furnished with a recommendation from a gentleman well known to the members of the firm; and it was stated that a quantity of it could be furnished if required. Upon examination, the saffron was refused by the firm, as it did not answer to their tests of true saffron, and a sample was afterwards forwarded to this Society for further investigation.\*

\* I shall be greatly obliged to any chemist, who, when he has reason to suspect the adulteration of any drug, but cannot satisfy himself upon the adulterant, if he will forward a specimen to me for further examination. In this way, old adulterations may be again exposed, and new ones detected and brought before the public.

Upon a superficial examination this specimen of saffron presented a considerable resemblance to genuine saffron in general appearance, color and odor. Upon a closer inspection, the odor was found to be much less penetrating and aromatic than that of true saffron, and to have added to it something of a different and peculiar nature; and the mass was seen to be principally composed of somewhat cylindrical twisted compressible bodies, with a few firmer thread-like ones intermixed, instead of being wholly composed of firm thread-like bodies, as would have been the case with a specimen of genuine saffron. In other words, the present specimen of saffron was found to be less fibrous or filamentous in appearance than that of genuine saffron.

Upon infusing a portion of the specimen in warm water, and comparing the appearances which it then presented with some true saffron exposed to similar conditions, the difference between the two was most striking, and could not but have been evident to any ordinary observer. Thus, in the case of the genuine saffron, the color was seen to be but slowly communicated to the water, which gradually assumed a deep orange-yellow color, and remained perfectly clear and transparent; and when the infused mass was stirred up and diffused through the liquid, the peculiar appearance and structure of the styles and stigmas constituting genuine saffron, as already noticed, (Fig. 4,) was clearly exhibited. With the other specimen, however, the color was almost immediately taken up by the water, which almost immediately assumed a deep orange-yellow color, and also presented a turbid appearance from the diffusion through it of small granules. These granules were also seen on the side of the glass vessel in which the infusion had been made; and although many of them ultimately subsided to the bottom of the vessel, many remained in suspension, so that the infusion, however long kept, never became clear. Upon examining the infused substance it was seen to be principally composed of a closely-adhering mass of very pale-yellow flabby, more or less flattened, and somewhat cylindrical twisted bodies, with a few thread-like deep orange-yellow ones intermixed. The appearance of this mass was most striking, and would in itself have led to the detection of the adulteration. It was seen at once,

from the shape and color of the filamentous portions, that they were genuine saffron, but the question now arose as to the nature of the other and greater portion of the mass. To determine this, I at first examined some of the separated pieces of the mass with a magnifying glass, and satisfied myself directly that they were not the florets or petals of any of the plants which had been hitherto alluded to as having been employed to adulterate saffron; neither were they the similar parts of any other plants, nor any substances hitherto described as adulterants of saffron; but, instead of any of these, I found bodies of a pale yellow color, half an inch or more in length, attached below to a firmer and nearly cylindrical stalk (Fig. 1, p. 225,) which latter was also, in some cases, adherent to a flattened portion of a petal or a tubular body. I also found a few larger pieces of the colored divisions of the perianth intermixed with the above. I concluded that the bodies under examination must be stamens, but in order to satisfy myself more completely on this point, I took a few of them on the end of a glass rod, and diffused them in a glass of cold water; that they were then the stamens of a *Crocus* there could be no doubt, for I had before me open cellular bodies half an inch or more in length, with a somewhat pointed apex and an arrow-shaped base (Fig. 1, p. 225.) Each of these was also seen to be attached below to a solid nearly cylindrical thread-like shorter stalk; and this latter was, in some instances, also adherent to a portion of a petal. Upon more complete examination in the same way, I found that some of the separated pieces were two or more inches in length, and consisted of a tubular portion below, from the inside of which there arose above three filaments, bearing at their extremities arrow-shaped (sagittate) anthers (Fig. 3, p. 225;) in fact, here was the tubular portion of the flower of a *Crocus*, with the three stamens found in it as in all the other plants of the Natural Order to which it belonged, attached. I could also readily make out by the unassisted eye, although still better by the aid of a small magnifier, the mode of attachment of the anthers to the filaments, and the manner in which they had dehisced. As the number of stamens and the attachment and dehiscence of the anthers is very marked in the order

*Iridaceæ*, to which the genus *Crocus* belongs, I had thus a further confirmation, if any were needed, of the adulterant being the stamens of a *Crocus*, which had been previously twisted so as to alter their natural form and characters, and thus render them more difficult of detection. In some cases I found similar tubular portions bearing two stamens (Fig. 2, p. 225,) the third stamen having become detached.

A very ready way of detecting this adulteration of saffron with stamens is to take a small portion of the suspected specimen and diffuse it in a glass of cold water by means of a stirring-rod for about a minute, the water will become immediately colored, and if the stirring be now discontinued the whole mass will rise to the surface of the fluid, and the genuine orange-yellow-colored saffron will be readily distinguished from the pale-yellow-colored twisted stamens. The proportion of adulteration may in this manner be readily estimated. If, instead of using cold water, boiling water be employed in the above experiment, I find a somewhat different result; thus, if the proportion of stamens in the specimen be large, as in the one now being described, the whole infused mass will rise towards the surface of the water in the manner just mentioned; but if there be only a small admixture of stamens, the genuine saffron will sink towards the bottom of the fluid, and the stamens alone rise and float on its surface. In the former case, the true saffron, being in small quantity, appears to be so entangled with the stamens, that it is carried upwards with them.

Having ascertained that the specimen of saffron was adulterated extensively with the stamens of a *Crocus*, I had an explanation of the cause of the turbid appearance of the solution formed by infusing some of it in water, as already noticed, and of the nature of the suspended granules. These granules must be those of the pollen which had been washed out of the anthers by the water in which the stamens had been infused; and, upon examining them by the microscope, I was able to prove that my opinions were correct. The best way to see these granules is to dip a glass rod into the turbid solution formed by macerating the adulterated saffron in water, and then drop the adherent fluid on a piece of glass. This is to be covered with

another piece of thin glass in the ordinary way, and placed on the stage of the microscope; the pollen granules will then be observed to be perfect globes, of a yellow color and glistening character. Mixed with the pollen a small portion of some angular earthy fragments will also be noticed. The proportion of this earthy matter, however, is not great, and hence its presence is doubtless accidental, and not an intentional admixture with the saffron, as is sometimes the case with sand, etc.

That the stamens thus used for adulterating saffron were those of the Saffron Crocus (*Crocus sativus*) I have every reason to believe, from minute examination of their form and appearance, and from comparison with those of other species of crocus; indeed, there would be no inducement to those by whom such an adulteration had been performed to throw the stamens of the saffron crocus away, and collect the corresponding parts of other species; it would be far easier to pluck the stamens and the parts constituting genuine saffron from the same flower at the same time, and mix them together. Moreover, the common species of crocus flower in spring, while the saffron crocus flowers in the autumn months; and hence, it would be still less probable that the stamens would be gathered from one species at one season and the stigmas from another species at a different period, and the two be then mixed together. It is possible, certainly, that the collector of the saffron might have had nothing to do with the adulteration, but that the purchaser of the genuine drug had afterwards mixed with it the stamens of another species of crocus, but having carefully examined the stamens in the present specimen, and compared them at the British Museum and Kew with those of the saffron and spring crocus, etc., I think there can be no doubt but that both the stigmas and stamens had been gathered at the same time and from the same plant, namely, from the *Crocus sativus*, and then mixed by the collector.

Having now proved that the specimen of saffron under examination was extensively adulterated, being composed, as nearly as I could ascertain, of about one-third genuine saffron, and the remaining two-thirds principally of twisted stamens, and to a slight extent of parts of the adherent or separated col-



ored divisions of the perianth, and of the tubular portions of the flower, another question now arose. The tubular portion of the flower of the saffron crocus, in its natural condition, is nearly white, while the anthers are pale yellow; but here the whole of the specimen had a nearly uniform orange-yellow color. This is, I think, readily to be explained. The stamens, etc., had been dyed with some orange-yellow-colored solution—probably the whole specimen together—by which a nearly uniform deep orange-yellow color had been given to it. That such was the case seems clear from a comparison of the different appearances produced on a mass of this saffron directly after its infusion in warm or cold water with that of genuine saffron under the same conditions; thus, in the former case, as already noticed, the orange-yellow color of the greater portion is immediately communicated to the water, and the anthers left of their natural pale yellow color, while the genuine saffron mixed with it retains the principal portion of its orange-color for some time afterwards; while in the latter, or true saffron, the whole retains its orange-yellow color for a long period. The nature of the coloring matter thus used for dyeing the saffron is more difficult to determine, and I am as yet by no means satisfied upon this point. It may have been a very strong solution of genuine saffron, and the similarity of the color produced by infusing in water this spurious saffron and that of genuine saffron would appear strongly to confirm this view; but when we remember how little genuine saffron is contained in it, yet the depth of color as shown by infusion and by its dilution with water, is scarcely in any degree less than that of genuine saffron, this becomes more doubtful. This, however, is a matter of comparatively trifling importance, and may be left for future investigation.

This adulteration of saffron with the stamens of crocus has never been noticed previously in this country; no allusion having been made to it in the works of Pereira, Royle, Christison, or other of our authorities on *materia medica*; neither had it, so far as I knew when the above was written, been noticed by foreign writers on pharmacology, but I have since had my attention directed to a note on a similar kind of adulteration by

Professor Guibourt, which had occurred in France. I do not, of course, mean to say that the stamens of *Crocus* have not been before noticed in specimens of saffron, for occasionally a few anthers may be detected in them; but as these are found of their natural pale-yellow color, and untwisted, no attempt having been made to dye and otherwise alter their appearance, their presence is evidently accidental, and due to carelessness in collecting saffron.

Since the above was written, I have examined various specimens of saffron obtained from different quarters, in two of which I have detected the same fraudulent admixture of stamens with the genuine drug. In both these instances, however, the admixture of stamens with the genuine saffron occurred to a far less extent than in the specimen I have particularly described in this paper. One of these specimens was certainly twenty years old, and was marked "adulterated saffron;" and the other was a specimen of saffron exhibited as genuine at the Great International Exhibition held in London in 1862. Such being the result of my examination in so short a period, I think it will soon be found that the adulteration of saffron with the stamens, etc., of *Crocus* is by no means rare in this country and elsewhere.—*London Pharm Jour.*, March, 1866.

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## NEW FLUID FOR PRESERVING NATURAL HISTORY SPECIMENS.

By A. E. VERRILL.

In consequence of the high price of alcohol, a series of experiments were undertaken by me last year, with the view of finding a substitute for it in preserving the soft parts of animals. Among the various solutions and liquids tested were nearly all that have ever been recommended, besides many new ones. Chloride of zinc, carbolic acid, glycerin, chloride of calcium, acetate of alumina, arsenious acid, Goadby's solutions, and various combinations of these and other preparations were carefully tried, and the results made comparative by placing the same kind of objects in each, at the same time. Although each of these, under certain circumstances, have more or less preservative quali-

ties, none of them were found satisfactory, especially when the *color* and *form* of the specimen are required to be preserved as well as its structure.

As a test for the preservation of color, the larvæ of the tomato-worm (*Sphinx quadrimaculata*) was used. These larvæ are difficult of preservation with the natural form and color, nearly always turning dark brown and contracting badly in alcohol and most other preparations.

As a result of these experiments the following solutions were found highly satisfactory in all respects when properly used. By their use the larvæ and recent pupæ of the tomato-worm were preserved and still retain their delicate green colors, together with their natural form and translucent appearance, while the internal organs are fully preserved. Fishes, mollusks, various insects, worms, and leaves of plants have also been preserved with perfect success and far better than can be done with alcohol. In the case of mollusks, especially, the preparations are very beautiful, retaining the delicate semi-transparent appearance of the membranes nearly as in life, with but little contraction. Another great advantage is the extreme simplicity and cheapness of the solution.

To use this fluid I prepare first the following stock solution, which may be kept in wooden barrels, or casks, and labelled :

#### SOLUTION A. I.

Rock salt,	. . . . .	40 oz.
Nitre (nitrate of potassa),	. . . . .	4 oz.
Soft water,	. . . . .	1 gal.

This is the final solution in which all invertebrate animals must be preserved. A solution with double the amount of water may be kept if desirable, and called A. II. Another with three gallons of water will be A. III.

In the preliminary treatment of specimens the following solution is *temporarily* employed, and is designed to preserve the object while becoming gradually saturated with the saline matter, for in no case should the specimen be put into the full strength of solution A. I., for it would rapidly harden and contract the external parts and thus prevent access to the interior. Even with alcohol it is far better to place the object for a time in weak

spirits and then transfer successively to stronger, and for some objects, as Medusæ, no other treatment will succeed.

#### SOLUTION B. I.

Soft water, . . . . .	1 gallon.
Solution A. I, . . . . .	1 qt.
Arseniate of potassa, . . . . .	1 oz.

Another solution with double the amount of water may be made if desired, and called solution B. II.

To preserve animals with these solutions they are, if insects or marine invertebrates, ordinarily placed first in solution B. I, but if the weather be cool it would be better in many cases to employ first B. II, and in the case of all marine animals washing first in fresh water is desirable, though not essential. If the specimens rise to the surface they should be kept under by mechanical means. After remaining for several hours, or a day, varying according to its size and the weather, in the B. I. solution it may be transferred to A. III, and then successively to A. II, and A. I, and when thus fully preserved it may be transferred to a fresh portion of the last solution, which has been filtered clear and bright, and put up in a cabinet, when no further change will be necessary if the bottle or other vessel be properly secured to prevent the escape of the fluid by crystallization around the opening. To prevent this the stopper, whether of cork or glass, together with the neck of the bottle or jar, may be covered with a solution of paraffine or wax in turpentine or benzole, which should be applied only when the surfaces are quite dry and clean. The length of time that any specimen should remain in each of the solutions is usually indicated by their sinking to the bottom when saturated by it. In general the more gradually this saturation with the saline matter takes place the less the tissues contract or change in appearance. In many cases, however, fewer changes than indicated above will be effectual. I have in some cases succeeded well with but two solutions below A. I. For vertebrates, except fishes, the solution A. II. will usually be found strong enough for permanent preservation, especially when the object is small or dissected. If the entire animal be preserved, when larger than two pounds in weight, it should be injected with the fluids, especially B. I. and the final

A. I. or II, or an incision may be made in one side of the abdomen in vertebrates, or under the carapex of crabs, &c., to admit the fluids more freely. In preserving the animals of large univalve shells an opening should be made through the shell at or near the tip of the spire. Mammals, birds and reptiles, should be placed first in solution B. II. to obtain the best results. In cases where the use of the B. fluids would be objectionable, on account of their highly poisonous nature, a fourth dilution of solution A. I, corresponding in strength with B. I, but without the arseniate of potassa, may be substituted, and in many cases will do nearly as well, if the weather be not very hot, but the specimens in this case should be carefully watched and transferred to the stronger solutions as soon as possible, so as to avoid incipient decomposition while in the first fluids.—*Silliman's Journal*.  
New Haven, Feb. 12, 1866.

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#### ON BORAX IN CALIFORNIA.

BY PROF. J. D. WHITNEY.

Some explorations have been made around the lower end of Clear Lake, more particularly for the purpose of getting an idea of the very interesting locality of borax, which is found in this region.

Clear Lake is about sixty-five miles north-west of Suisun Bay, and about thirty-six miles from the Pacific. It is believed to be about twenty-five miles long, but has never been surveyed, so that its shape and size are not accurately known. \* \* \*

At the angle where the narrow part of the lake opens out to the west is a high mountain, which comes down with a precipitous front to the water, and which is supposed to be about 2,500 feet above the lake level. It is called the "Uncle Sam Mountain," and, as seen from the opposite side of the lake, it appears to be made up of a closely-folded synclinal mass, probably of somewhat metamorphic Cretaceous sandstones. On the south-west side, and to the south-east, volcanic materials and rocks occupy the surface, as is well seen in a crater-like depression on the south-west side of the narrow arm of the lake, called "Thurston's Lake," which is partly covered by water, and surrounded on all sides by high cliffs of volcanic rocks, appearing as if it might

have been one of the vents from which the eruptive matter, obsidian, ashes and pumice, so abundant in this region, were ejected. On the eastern side of the narrow arm of Clear Lake, nearly opposite to, and about four miles distant from, Thurston's Lake, is a large accumulation of volcanic materials, with much obsidian and pumice. In fact, all through the Chain of the Coast Ranges in this direction, down Grizzly Canon to Bear Valley, on the trail to Colusi, there are hot springs and the remains of Solfatara action, indicating strongly a cross-fracture in this region, through which the volcanic agencies have made themselves perceptible, and which probably connects on the south-west with the Geysers, thus forming a line of volcanic action nearly if not quite across the chain.

Among the evidences of the former working of volcanic forces in this region, there is nothing more interesting and remarkable than the so-called "Borax Lake" and its vicinity. This lake occupies a depression on the east side of the narrow arm of Clear Lake, from which it is separated by a low ridge of volcanic materials, lying loosely heaped together, and consisting of scoriæ, obsidian and pumice. The Borax Lake is of variable dimensions, according to the season of the year and the comparative dryness of the season. When examined, (September, 1863,) the water occupied an area about 4,000 feet long, and 1,800 feet wide in the widest place, and its shape was irregularly oval, its longer axis being turned in the direction of east and west, magnetic; it has once extended nearly twice as far to the south-east, as the ground is hardly raised above its present level in that direction for nearly a mile. The lake is said to have been entirely dry during the summer before the great rains of 1861-62. In 1863, the water was about three feet deep.

The existence of this lake was first made known to the world by Dr. J. A. Veatch, who examined it in September, 1856, and detected the presence of borax in its waters; but it was not until some months afterwards that the existence of a large bed of crystals of this valuable material in the bottom of the lake was discovered. The land about here has been located by the "California Borax Company," the agents of which have caused explorations to be made, have had the waters carefully analyzed,

and were, in 1864, preparing to manufacture borax on a large scale.

The water collected from the Borax Lake in September, 1863, as analyzed by G. E. Moore, contained 2401.56 grains of solid matter to the gallon, of which about one-half was common salt, one quarter carbonate of soda, and the remainder chiefly borate of soda, there being 281.48 grains of the anhydrous biborate, equal to 535.08 of crystallized borax to the gallon. Traces of iodides and bromides were also detected. A sample of water taken from the interior of a coffer-dam sunk in the middle of the lake, and which had been allowed to fill by percolation from the bottom upward, was found to be more concentrated, yielding 3573.46 grains of solid matter to the gallon; but it contained nearly the same ingredients, and in the same proportions, as the water of the lake itself. The borax, being the least soluble substance contained in any notable quantity in the water, has in process of time crystallized out to a considerable extent, and now exists in the bottom of the lake in the form of distinct crystals, which are of all sizes, from microscopic dimensions up to two or three inches across. These crystals form a layer immediately under the water, intermixed with blue mud of varying thickness; as observed in the coffer-dam sunk in 1863, the layer of crystals was about eighteen inches thick, and beneath it was mud without crystals. The thickness, however, of the deposit is undoubtedly very variable, and there are, in places, several layers of them separated by beds of clay or mud. It is believed, by those who have examined the bottom of the lake, that several million pounds of borax may be obtained from it by means of movable coffer-dams, at a moderate expense, and so as to yield a handsome profit to those engaged in the enterprize. How much of a supply of water could be obtained by boring, and what its quality would be, can hardly be settled in any other way than by actual experiment.

Lying about a mile beyond the ridge which borders the Borax Lake on the north-east, and at the foot of a shorter arm of Clear Lake, which extends off to the south-east parallel with the longer one, is an interesting locality where solfatara action is still going on, and where a large amount of sulphur has accu-

mulated. This is called the "Sulphur Banks." It consists of a much decomposed volcanic rock, fissured in innumerable places, through which fissures steam and gas are constantly issuing, and all over and through which large quantities of sulphur have been deposited, so as to give the mass, from a little distance, the appearance of being entirely composed of this material. Into some of these cavities a pole may be inserted for several feet, and they are often lined with fine crystallizations and stalactites of sulphur. No doubt, a large quantity of this material could be obtained here, and the time will probably come when it will be made available. It is the largest deposit which we have seen in the State, covering several acres of ground; but to ascertain its value and determine the quantity of pure sulphur it contains, it would have to be dug into at various points.

Near the sulphur bank, just at the edge of the lake, is a hot spring, of which the outlet is, even at low water, partly beneath the lake, so that the amount which flows from it cannot be ascertained without some expenditure, to keep out the surrounding water. The flow of this spring seems to be quite variable at different seasons, and probably the amount of material it holds in solution is far from constant. Dr. Veatch found the area over which hot water was percolating through the sand to be 150 by 75 feet in dimensions; at the time of our visit, it was much less; nor was the estimated yield anything like as great as he made it, namely, three hundred gallons per minute.

The water of this spring, as analyzed by Mr. Moore, is found to be of a remarkable character; his analysis is subjoined.

	Grains in one gallon.
Chloride of potassium . . . . .	trace.
Chloride of sodium . . . . .	84.62
Iodide of magnesium . . . . .	.09
Bromide of magnesium . . . . .	trace.
Bicarbonate of soda . . . . .	76.96
Bicarbonate of ammonia . . . . .	107.76
Biborate of soda . . . . .	103.29
Sulphate of lime . . . . .	trace.
Alumina . . . . .	1.26
Carbonic acid (free) . . . . .	36.37
Silicic acid . . . . .	8.23
Matters volatile at a red heat . . . . .	65.77

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 434.35



In this table, the constituents are necessarily calculated as anhydrous salts; the biborate of soda, however, contains about 47 per cent. of water when crystallized, and the 103.29 grains given above correspond to 195.35 of crystallized borax. The most extraordinary feature in the above analysis is the very large amount of ammoniacal salts shown to be present in this water, in this respect exceeding any natural spring water which has ever been analyzed. Mr. Moore thinks that, as in the case of the boracic acid waters of Tuscany, this ammoniacal salt may be separated and made available for economical purposes. This locality is worthy of a most careful examination to ascertain how considerable a flow of water can be depended on.—*From Prof. J. D. Whitney's Geological Survey of California*, vol. i., p. 96.

*Additional note.*—The San Francisco papers received last Saturday state, in regard to the California borax: During the year, they have supplied the local demand of thirty to forty tons and shipped two hundred tons to New York. The borax is collected from the mud at the bottom of the lake, during the dry season, the yield last season averaging about two and a half tons per day. The "crude borax" thus obtained is "so pure that the Mint and assayers of the city use the crude article in preference to the refined brought from abroad."—*Silliman's Journal*, March, 1866, from *Weekly Bulletin*, Jan. 13th.

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## WHY DO BEES WORK IN THE DARK.

BY CHARLES TOMLINSON, F.C.S.

About two years ago a paragraph appeared in the *Chemical News* (April 30, 1864,) and went the round of the papers, under the title of "Why Bees Work in the Dark," in which it was stated (1) "that the change of honey from a clear yellow syrup to a solid mass is a photographic action; that the same agent which alters the molecular arrangement of the iodide of silver on the excited collodion plate, and determines the formation of camphor and iodine crystals in a bottle causes the syrupy honey to assume a crystalline form." In proof of this, M. Scheibler enclosed honey in stoppered flasks, some of which were kept in

the dark while others were exposed to the light, when it was found that the sunned portion rapidly crystallized, while the honey kept in the dark remained perfectly liquid. (2) "We now see," he says, "why bees are so careful to work in perfect darkness, and why they are so careful to obscure the glass windows which are sometimes placed in their hives. The existence of their young depends on the liquidity of the saccharine food presented to them, and if light were allowed access to this the syrup would gradually acquire a more or less solid consistency; it would seal up the cells, and in all probability prove fatal to the inmates of the hives."

While I was on a visit to a village on the Dorsetshire coast at the end of July, 1864, some new combs were brought in containing virgin honey, when it occurred to me to test the observation on which the above theory is founded, and the more so since the remark that "light determines the formation of camphor and iodine crystals in a bottle," I knew to be erroneous. Accordingly, I collected a small quantity of this new honey in two bottles, and wrapped one of them in several folds of stout paper and left the other exposed. On my return to town early in August, I placed the bottles in an east window, where they remained many months exposed to the cold of winter and the sun of spring, with the temperature often below freezing point, and on warm days above 70° Fahr. The honey in both bottles remained quite fluid, and the only change was the deposit in each bottle of a few bright crystalline grains.

A still more perfect experiment was made in July, 1865. Being in the same Dorsetshire village I procured some virgin comb that had never seen the light, squeezed it gently through clean linen, and received the stream of pure, limpid honey into two eight-ounce white glass bottles. When these were nearly filled the stoppers were inserted, tied over, and the bottles labelled. One was wrapped up in opaque paper, and the other was, a few days afterwards, exposed to the light on a window frame, where it has remained ever since, exposed to the direct sunshine of summer, and to the cold of winter; but the honey, whether exposed to the light or covered, remains perfectly limpid after about eight months.

A bottle of honey from Rosenthal, in Switzerland, was procured from Messrs. Fortnum and Mason. This, they said, was three years old and improved by keeping. It was in a bottle of light-green glass, and had been in their shop window for a long time. I transferred a portion of this honey to a white glass bottle, and it has been exposed to the light for about ten months, and is still (February, 1866) quite fluid.

Virgin honey from Bromborough Pool, near Birkenhead, exposed to the light during many months, remains quite fluid; but old honey—*i.e.*, gathered from combs of the second year, whether exposed to the light or not, soon became solid. So also honey from near Dunstable, gathered from a new comb, became solid, contrary to the above experience, whether exposed to the light or not.

These facts sufficiently prove that “the sunned portions” of virgin honey do not always “rapidly crystallize.”

The specimens of new honey, then, had, with one exception, not solidified after many months' exposure. I endeavoured to bring some Dorsetshire honey into the candied state by placing it in a capsule over sulphuric acid under the receiver of an air pump. The honey thus operated on was taken from a jar prepared in the usual way, by steaming the combs; it was darker in color than that exposed to the light, but still quite fluid. It was kept *in vacuo* about a fortnight; the pump was worked two or three times a day, and at each working there was a disengagement of air bubbles, as if a slight fermentation had been going on in the honey, but it did not candy. The capsule was now placed on the window ledge by the side of the bottles containing the virgin honey. It was left exposed to the air during some weeks, in which time it not only did not candy, but increased in bulk to overflowing, thus proving the presence of some deliquescent material.

Acting on this idea, I weighed out 100 grain portions of honey from different sources into watch glasses, and exposed them on the window-ledge. They all absorbed moisture more or less, and the absorption was greatest in damp weather, but in very unequal proportions; for while Normandy honey absorbed  $8\frac{1}{2}$  grains of moisture, Minorca honey absorbed only  $3\frac{1}{2}$  grains, and when the

former weighed  $103\frac{1}{2}$  grains the latter had actually lost weight, the 100 grains being only  $99\frac{1}{2}$  grains. The Dorsetshire honey was by no means so absorptive as the Rosenthal, but in all four cases that were tried there was absorption of moisture during damp weather, and loss of moisture during dry; showing, in fact, the presence, in greater or less quantity, of deliquescent salts in the honey.

Remembering the fondness of bees for salt water, it seemed probable that the difference between the Dorsetshire honey and the Hertfordshire honey might arise from the fact that the one contained a minute proportion of salt, or of the salts of sea water, which was absent in the other.

The fondness of bees for salt has long been a puzzle to entomologists. Dr. Bevan, in his work on "The Honey Bee," says:—"I keep a constant supply of salt and water (about a teaspoonful to a pint) near my apiary, in a shallow dish, covering the bottom with small pebbles, and find it thronged with bees from early noon to late in the evening. About this period (*i.e.*, the spring) the quantity they consume is considerable, but afterwards they seem indifferent to it." In the volume on bees contained in Sir William Jardine's "Naturalists' Library," it is stated, p. 49, that "bees have recourse in spring, but generally speaking in spring only, to dunghills and stagnant marshes for the sake of the salts with which they are impregnated, and which their instinct teaches them are advantageous to their health after their long winter confinement."

It seemed more probable that bees collect small portions of salt for the purpose of keeping their honey fluid than for the purposes of medicine, as suggested by the last quotation. To test this, two portions of 120 grs. each of the candied Hertfordshire honey were scraped from a spatula upon the edges of two evaporating dishes; one specimen was sprinkled with about 2 grs. weight of marine salt, such as are used for making artificial sea water. In the course of a few hours this honey showed signs of liquefaction, although the weather was cold; and in the course of two or three days it had run down into the dish in a liquid form, so that it could be poured. The honey in the other dish continued for weeks adhering to the edge, showing much less decided signs of liquefaction.

The examination of various specimens of honey did not confirm this view, but it led to the detection of a variety of salts, among which lime was particularly abundant, especially in honey from inland places. Potash was also found in considerable quantity, and this would tend to make the honey deliquescent. As far as my examination has extended, nothing seems to explain why some varieties of new honey become candied sooner than others. The presence of lime does not seem to explain anything, except that bees may introduce a good deal of filth into their honey; for the lime was probably gathered in the form of nitrate, which is an abundant salt in water from dunghills, stagnant ponds, and bogs, and wherever there is decaying animal matter; so that the bees drinking at such places must be a happy thought for honey eaters. But one practical suggestion arises from this examination—namely, supply your bees with salt and water, and they will probably not frequent dunghills. In places near the sea bees can procure common salt and the salts of sea water for themselves; and it will be remembered that the most celebrated honeys of the world, such as those of Mount Hymettus, Mount Ida, Mahon, Cuba, the Bermudas, &c., are all fluid, and even syrupy, and that all these places are within easy access of the sea.

I asked my friend Mr. Rodwell to examine two specimens of honey, both inland—one from Switzerland and the other from Hertfordshire. He found in the Swiss honey, iron, alumina, and phosphates, together with lime, magnesia and potash; and in the Hertfordshire honey all the above ingredients, together with ammonia. As far as the results of the examination of these and the other specimens are concerned, it would seem that bees are extensive collectors, picking up all sorts of stray materials for the purpose of making up their tale of honey. Whether there is any dishonesty in this on the part of the workers, whether these various salts serve some purpose not yet determined, or whether they get accidentally into various kinds of dirty water which the bees drink, we cannot say. At any rate, the fact is very curious that such a variety of salts should be found in honey. It is most probable that honey from other localities would show a similar varied constitution of the ash.

Honey has been regarded by chemists as a solution, more or less concentrated and aromatized, of a concrete in a liquid sugar; but that the climate, the season, the temperature, the kinds of plants on which the bees pasture, give rise to the great differences noticed in the honey of different localities. Some kinds contain only a small proportion of the concrete sugar; others so much as to be nearly solid. The color and aroma are said to depend on the plants, but in wet years or in moist climates and in marshy places, the honey is more liquid, and remains so for a longer time.

Honey is nearly always acid, and the presence of acids tends to keep it fluid, of alkalis to turn it brown. The honey from marshy districts is said to be brown, and the taste not pleasant.

The liquid sugar of honey is said to consist of  $C_{12}H_9O_9 + 3HO$ , and the solid portion or glucose of  $C_{12}H_9O_9 + 5HO$ ; so that the change from the liquid to the concrete form arises from the combination of two atoms of water. In such cases the  $2HO$  must be taken from another portion of the same honey—that is, the elements are simply re-arranged; for if the change were, as stated in some books on chemistry, due to time and the appropriation of two atoms of water from the air, we should have  $C_{12}H_{12}O_{12} = 72 + 12 + 96 = 180$  lbs. of fluid honey, becoming  $C_{12}H_{14}O_{14}$ , or  $72 + 14 + 112 = 198$  lbs. of solid honey—an increase of 10 per cent. in weight, which cannot take place when liquid honey in sealed bottles becomes candied. My experiments tend to show that the absorption of water by exposure renders the honey more liquid, not more solid. The change in the honey may be a molecular one, resembling in some respects that which takes place in barley sugar when kept some time either in the light or in the dark.

The proportions of the two sugars in honey vary so much as probably to account for most of the differences observable in different specimens. It is said the concrete glucose is more abundant in spring than in autumn, if the year be dry, than if wet, and in countries abounding in labiated and aromatic plants than in others. The liquid portion is more soluble in concentrated alcohol than the solid, and in this way the two can be separated.

Any experiments on this subject must be with virgin honey,

or that drained from the new comb. This, in the Dorsetshire specimen, was colorless and limpid, but when prepared from new and old combs by the action of heat the honey becomes changed, and candies sooner, although a jar of Dorsetshire honey thus prepared at the end of July, 1864, was sufficiently fluid to be poured from the jar in the following March.

But the question still remains unanswered, "Why do bees work in the dark?" In reply to this question from the bees' point of view, it must be remembered that the bees know nothing of the physical property of transparency; they argue that the path by which light enters will also admit their enemies. The poor fly that knocks his head against the pane of glass will never understand why he cannot get through it; and the bee, with all his sagacity, will not appreciate his security under a transparent hive. But it is not true that honey does not solidify in the hive. The volume of the "Naturalists' Library" from which we have already quoted, states (p. 119) that the heat and vapour of the hive are injurious to the honey, and that "in very severe seasons it is sometimes candied."—*London Chem. News*, March 2, 1866.

King's College, London, February 17.

#### THE ACTIVE PRINCIPLES OF HELLEBORUS.

The physiological experiments hitherto instituted with hellebore and its various preparations, have only been made on animals, and as it appears, up to within a few years ago, with much uncertainty as to the species employed by the experimenters. The older statements probably refer all to *Helleborus viridis*. Vulpian, Koelliker, Pelikan, and others, assume an immediate tendency to the heart, Schroff also an irritating narcotic action. Marmé and Husemann, who have lately separated several proximate principles of *H. viridis*, *niger* and *fætidus*, make the subjoined statements with reference to the physiological action of those principles.

The root and lower leaves of the three species named contain originally two non-volatile active principles, of the nature of glucosides, to which the authors have given the names *helleborein* and *helleborin*; in addition *H. fætidus* probably also contains a

third volatile principle. The two substances named act as poisons on all animals, and, presumptively, on man; while the product of their decomposition by acids are without any effect on the animal organism. The so-called oil of hellebore described by Feneulle and Capron, when freed from those glucosides, may be taken in considerable doses without untoward effects. It is remarkable that the helleborein from the green species is much more active than that of *H. niger*, and probably of *H. foetidus*. This substance shows a characteristic indifference to chemical agents, alkalies, or ferments, but is readily soluble, and for both reasons, easily absorbed, with a decided local action, although not an irritating one on the epidermis; on the other hand, it strongly irritates mucous membranes. The conjunctiva, when it is applied, reddens, swells with enlarged secretion, and, indirectly, enlargement of the pupil. On the mucous membrane of the nasal canal it causes sneezing, but not to the same degree with veratria. The salivary glands are excited by it, not only upon direct application, but also when it enters the general circulation. Small doses produce no effect on the stomach, but when accumulated they cause loss of appetite, nausea, even to emesis, pain, enlarged secretion, and gastro-enteritis. The kidneys likewise experience a stimulating effect, and the female genitalia are also affected. Very small doses act on the heart very much in the manner of digitalin, retarding the circulation, while in large doses it accelerates the same, often to fatal rapidity. There may also exist both gradual paralysis and convulsion.

The other glucoside, helleborin, is less soluble in water, but a more active poison when given in small doses, though less irritating to the mucous membrane. Its action on the tongue is similar to that of aconite. The nervous system is peculiarly affected by this substance. In measure with the dose and the susceptibility of the animal, it caused a greater or less degree of nervous excitement, beginning with accelerated breathing, great unrest, tension and trembling of the muscles, great depression, uncertain movements, then retardation of breathing and pulsation, irritability of the nerves of the periphery, strong enlargement of the pupil, the acoustic nerve insensible, finally almost complete anæsthesia, also strong hyperæmia of the brain and spinal marrow,



and even apoplexia. Otherwise its action is similar to other narcotics.

The very decidedly poisonous properties of *H. fœtidus*, which contains less of the second glucoside, is most probably due to a volatile principle, together with the true narcotic principle, helleborein.—*Druggists' Circular*, April, 1866, p. 90.

## ON CANTHARIDIN.

Mr. Bluhm, (*Pharm. Zeitsch. Z. Russland*, II. 160,) states that the usual methods for the extraction of the active principle of Spanish flies do not yield the whole quantity of it that is present, on account of a portion remaining behind in the form of an insoluble compound. To obtain this portion, he recommends that the powdered flies should be stirred up to a paste with one-third their weight of calcined magnesia and some water, and the mixture then be dried on the water-bath; after which, it should be supersaturated with dilute sulphuric acid, and then repeatedly shaken with ether. The latter extracts the cantharidin with fatty and yellow coloring matter, of which impurities the first is removed by bi-sulphide of carbon, and the last by alcohol. Cantharidin is, however, somewhat soluble in those menstrua. In many respects it acts like an acid, forming compounds with bases:

				Cantharidin.
100 parts by weight of	Alcohol (64° F.)	dissolved,		·03
"	"	"	Bisulphide of Carbon.	" ·06
"	"	"	Ether	" ·11
"	"	"	Benzole	" ·20
"	"	"	Chloroform	" 1·20

This substance is not volatilized when boiled with water. The author uses its form of crystallization as well as that of the magnesia compound to distinguish it, together with its vesicating action. The officinal fly showed ·26 per cent. of the principle, while a species of *mylabris*, common at the author's place of residence, contained nearly double (half per cent.); *Mylabris Melanura* of the same neighborhood had very little.—*Druggists' Circular*, April, 1866.

THE EMPLOYMENT OF GELATIN INSTEAD OF METAL  
FOR BOTTLE CAPSULES.

BY A. F. HASELDEN.

[The author introduces his article by an extract relative to the English Patent Office, from "Temple Bar," and then refers to the annoyances to which apothecaries and others have been subjected by suits under the patent laws by the proprietors of Betts' Patent Metallic Capsules, and continues as follows:]

"In the meantime all must commiserate the luckless tradesmen who run the risk of getting entangled in the meshes of Mr. Betts's Chancery web. We do so heartily; and therefore beg to suggest to them a most efficient substitute for the metallic capsule, namely, *gelatine*, applied precisely in the same way as sealing-wax or resin—that is to say, in its melted condition, the top of the bottle being dipped into it. It is obvious that by repeated dippings, after cooling, any thickness of capsule may be effected.

"We must observe, however, that *gelatine* is too brittle when used alone, but, fortunately, science suggests a ready and effectual 'alloy.' This alloy is *glycerine*, that curious substance of which we may say that it is impossible to decide to what purpose it may *not* be applied. The proportion in which it may be added to the melted *gelatine*, to give it pliability and toughness, is about one ounce and a half to the pound of the latter, well stirred in. Of course, any color may be given to these capsules, either for ornament or to distinguish readily the various liquors or other preparations. In hot climates, there are voracious insects that attack and eat everything,—to wit, the white ant in China,—and, of course, they are fond of all animal matter, so that the *gelatine* capsule will be endangered; but here again we are ready with the remedy. Bitter aloes and other repellents may be added to the melted mass, to secure this opportune rival from those tropical plagues, whilst it rescues its users from the worst of all plagues—the law, lawyers and inexorable 'patent rights.' "

So far the writer in "Temple Bar," and very easy and feasible it appears; but there is, in carrying out the *gelatine* scheme, some practical difficulty to be overcome. To make the subject as clear as possible, let me ask, what are or were the disadvan-

tages of the old sealing-wax and resin plan. In the first place, for home consumption, there was very little variety beyond the quality of the wax or resin, and the impression or seal stamped thereon—in many cases, no impression at all; in a general way, in removing the cork, the resin flew about, and, being very adhesive when at all warm, was exceedingly disagreeable. When the cork was cut short off and flush with the neck of the bottle, it was almost next to impossible to extract the cork without some of the resin or wax falling in amongst the contents; and this may be especially noticed in all the one-ounce bottles of quinine. Again, in those articles sent to hot climates, the resin or wax became partially melted, and the paper in which the commodity was wrapped adhered to the resin or wax; and so any distinguishing seal, stamp or mark became obliterated, and thus for any purpose of protection was valueless. Again, if the cork, as is commonly the case, be left long, and simply tied over with paper, membrane or leather, there can be no positive protection or guarantee that the contents have not been changed, mixed or otherwise tampered with. Moreover, both the paper and leather, like labels, if exposed in the window or on the counter, become dirty, and, as they cannot be cleaned, must be renewed: thus, the cost of capping is doubled and sometimes trebled; and in the case of proprietary articles sent abroad, if there was any peculiarity in the capping, as it could neither be cleaned nor exchanged, there must, I feel, have been frequent annoyances and sometimes loss.

Now, the metallic capsule was calculated to remedy much of this, although not the whole of it. It made a neat and polished finish; fly-marks, dirt or dust could at any time be washed off, and, if the capsule was properly applied, it became, to a great extent, a protection; so far, good and favorable to the employment of metallic capsules. On the other hand, if the capsule was carelessly put on, it was quite possible to remove it and replace it without injury, detriment, or discovery. Again, any writing or maker's name was not very distinct, and could only be made out after some study; moreover, there could be very little variety in appearance, which variety, in some business, is almost a necessity: variety lends a charm to most things, and

assuredly to the appearance of the shop of a pharmacist, a perfumer or an oil and Italian warehouseman, by whom a large amount of capsules have been used. These are some of the drawbacks to metallic capsules, to say nothing of any vexation on their account from other sources.

In gelatine we have a substance which, in the matter of capping, may be turned to account in more ways than one; still there are some obstacles in the way to perfection, but only such as may be overcome. There is room left by the writer of the "Temple Bar" article for a considerable amount of practical working. It would seem, upon the first reading, that it is only requisite to melt the gelatine, color it to taste, dip in the corks and necks of the bottles, and in a twinkling, like the tricks in a pantomime, the thing is done. Let us see what really occurs. Having melted the gelatine with as little water as necessary, and if any dirt be present having strained it, the requisite quantity of glycerin being added, and also some liquid cochineal to give a tint, the cork and neck of the bottle is dipped into it, taking care to have plenty of the material and sufficient room for the bottle; and the result is this, that, there being no slanting side-walls to the corks, the melted gelatine sticks about the cork, runs down the sides over the rim of the neck of the bottle, and gives, to say the least, a very unsightly appearance. If the cork is cut flush with the mouth of the bottle, a better thing is made; but the solution being transparent, although colored, the top of the cork or bung shows through, and has by no means a neat look. It is obvious that this latter part is to be remedied by making the solution opaque, either with white-lead, gamboge, dragon's-blood, or vermilion, as may be seen by bottles on the table. If the cork is to be left long, as in most bottles containing liquids, then the side-walls, so as to form a perfect capsule, must be first made by tying over with membrane, leather, or paper, and then by dipping either into the transparent or opaque solution, and thus a very good substitute for a capsule can be made; but as yet there is nothing to indicate any particular article or maker; there is nothing to prove that the covering has not been taken off and afterwards re-tied and dipped. To meet this want,—and it is a want, because most capsuled articles are proprietary ones,—the transparent solution, either plain or col-

ored, must alone be used; any name, device, band, or trade-mark may be first affixed, and then the dipping should take place. Colored leather can be employed, as in some of the samples. I may mention that generally two dippings will suffice for paper and skin, and three for leather, as that substance absorbs more; but it depends upon the strength of the solution, and a little practice will do more than a whole written volume in producing expertness. For the opaque capsule, where a name is not material, Russian glue will answer as well as gelatine, and at a considerably less cost. Amongst the various specimens which I have brought, there is one with aloes, for the especial patronage of the insects. I think I hear some one say, How about the cost? To this I am not quite prepared with an answer, but I do not think it could equal that of metal; something less than a shilling would pay for all the gelatine I have here used, say 60 to 70 bottles. I think another inquires, How long have they been done? Many in the early part of December, six or seven weeks, and these appear as perfect now as then. I must just say another word in favor of gelatine. When the bottle is to be opened, if the cork has been made short, it is only necessary to cut through the gelatine, which is easily done, and then remove the cork in the usual way: no pieces will fall amongst the contents. For bottles with long corks, and covered with any of the materials mentioned, cut the capsule round and remove it, but it cannot be used again for the same or any other bottle, and is thus, with a proper mark or label, a certain and perfect protection against the probability of the bottle being refilled with a substitute without detection; and, when dirty, the gelatine capsule can be cleaned with a sponge and a little water, thus effecting a considerable saving.

I have thus endeavored, with the assistance of "Temple Bar," to lay before you a subject which, I believe, may be advantageously made use of. I feel that I have not thoroughly exhausted it, and that some of you, more ingenious than myself, will be able to work it out more perfectly, and then, as I have done, bring your results to a future evening meeting.

"Into your scrip I pour my little store,  
And as I give, I wish the little more."

—*Lond. Pharm. Journ.*, March 1, 1866.

## THE MANUFACTURE OF CITRIC ACID BY CITRATE OF MAGNESIA.

BY M. PERRET.

The manufacture of citric acid from lemon juice is an operation of considerable delicacy.

The industrial resources of Sicily, and the want of practical processes, render this fabrication impossible on the spot where the fruit is produced; the readiness with which lemon juice, the natural lemons, and the citrates of lime which have been made on the spot become altered, occasions great losses to the English manufacturer, who imports these various products from Sicily.

These considerations, joined to that of the saving in cost of transport, which would result from producing the citric acid in Sicily itself, have determined me to undertake some researches in this direction, by which I have arrived at a very satisfactory process.

It consists in making a tribasic salt of magnesia, and transforming this salt into a crystallizable bibasic salt.

The fresh lemon juices are treated directly by an excess of magnesia, which is abundant in Italy.

A perfectly insoluble tribasic citrate of magnesia is thus formed. This salt does not become altered; precipitated hot from the juices, it is in the form of a granular powder, very dense, readily separating in water (which softens it,) and which, seen through a magnifying glass, is found to be composed of a mass of small prismatic crystals; this powder, freed from mother liquor by some cold washings, or by a single washing, and dried, is perfectly unalterable, resisting moisture and heat for a long time without becoming covered with mould.

This salt, then, such as it is, may be despatched from the place where the citric acid is made; but it is evidently better to accumulate the acid upon this salt, and for this purpose I treat a given weight of tribasic citrate with a fresh quantity of lemon juice equal to that which served in the first operation; throwing the tribasic citrate in small portions into the hot lemon juice, where it instantly dissolves.

Having thus obtained the solution of bibasic salt, I leave the solution to deposit, decant and evaporate in vessels as wide as

possible, until the boiling solution marks  $23^{\circ}$ , when I allow the liquid to stand. In twelve hours' time an abundant crystallization (which continued for ten days) was already deposited, consisting of a citrate, which was the bibasic citrate.

I have submitted to the Society some specimens of this salt prepared in the way described, and which, it may be seen, crystallize very distinctly.

It is this compound which, being very easily made in Sicily itself, it would be advisable for English and French manufacturers of citric acid to import.

The object of my note is to make known,

- 1st. A new process for making citric acid.
- 2d. An easy way of obtaining citrate of magnesia, which has not hitherto been obtained, and which is therapeutically of importance.

I obtained the same result by using citric acid and magnesia or sub-carbonate; so that for pharmaceutical purposes my crystallized citrate is very easily prepared, and for lemonade may be used in the proportion of

Crystallized citrate . . . . .	80 gr.
Sweetened and flavored liquid . . . . .	350 to 400 "
Bicarbonate of soda . . . . .	4 "

Lemonade prepared in this way will keep a very long time.—  
*Lond. Chem. News*, March 2, 1866, from *Bulletin de la Société Chimique*, January, 1866:

#### VERMIFUGE PROPERTIES OF PUMPKIN-SEEDS.

Whether the circumstance be due to the inefficacy of kousso, or the high price of the drug, pumpkin-seeds are again becoming with the profession a popular remedy for tapeworm. We may adduce, in illustration of this statement, two papers published in the month of August by M. Bouvier, a medical officer in the Belgium service, and by Dr. Desnos, of the hospitals of Paris.

M. Bouvier relates, in the "*Archives Médicales Belges*," that a little German boy, aged 5, and his sister, both presented symptoms of tapeworm after eating raw and smoked Westphalian ham. The little girl had been cured two years previously,

but the boy, who had been ill three weeks only, was in a state of alarm ng emaciation. Pomegranate-bark had been exhibited, but its only effect was to induce severe colic. M. Bouvier then prescribed pumpkin-seed paste, prepared by bruising an ounce of the seeds denuded of their cuticle with sugar, and adding two ounces of milk. On the previous day, the child had taken two teaspoonfuls of castor oil, and was kept on low diet. The oil was repeated on the day which followed the exhibition of the paste, and no food was allowed.

The medicine was taken without repugnance, and produced neither colic nor nausea. Several motions were induced, in each of which fragments of the tapeworm were detected, and the head and hooklets were found next day in a hard stool. The mother having thus acquired the certainty that a cure was effected, at once displayed the undoubted proofs of the happy results of the medicine to Dr. Bouvier.

Dr. Desnos reports two closely analogous cases in the "*Journal de Chimie Médicale*." The patients were a saddler, aged 33, and an operative, aged 22. In the former, the leading feature was an enormous increase of appetite; he consumed as much as twenty-four pounds of solid food in the course of the day. The tænia was passed after two days' treatment. Forty-eight hours after his admission into the hospital, the patient drank a bottle of seidlitz-water, and took an emulsion prepared with ten drachms of pumpkin-seeds, five drachms of castor-oil, and the same quantity of honey.

The medicine was exhibited in the morning, and in the afternoon the patient passed two mètres of tænia, with the head of the parasite.

In the second case, kousso had been resorted to without benefit. On the 9th of July, two days after the patient's admission, he was deprived of food, and on the 10th took an emulsion of pumpkin-seeds denuded of their cuticle, in six ounces of water, and half an hour later three tablespoonfuls of castor oil, mixed with an equal quantity of peppermint-water. On the 11th, the worm was passed entire, rolled up in a ball; the patient suffered some pain, but less violent colics than he had previously experienced from the kousso. On the 12th, castor-oil was again administered, and no relapse has since taken place.



Dr. Desnos remarks, in conclusion, that results even more favorable may be obtained from the combined action of the resinous extract of male fern with pumpkin-seeds; the following is the formula recommended by Dr. Debout:—

R Pumpkin-seeds, 3x.

Sugar, 3j.

Water, 3vj.

Extr. of male fern, 3j-ij.

To be taken fasting in four doses, at intervals of a quarter of an hour.—*Lond. Pharm. Journ.*, and *Dublin Medical Press*, from *Journ. of Pract. Med. and Surgery*.

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#### COPAL RESIN.

To clear up any of the doubts which exist as to the true source or rather sources of this resin, would be to solve one of the many problems in economical botany. The term Copal, as is well known, is applied in commerce to most clear resins capable of producing a colorless varnish; for instance, East Indian Copal or Piney Varnish is produced by *Vateria indica*, L., a tree of the Natural Order *Dipterocarpaceæ*, while the African copals are undoubtedly the produce of Leguminous trees. The source of gum anime is another of these economic puzzles. One of the differences between those two resins—copal and anime—is that the former is mostly very clear and almost colorless, while the latter is always of a brownish tint. Both resins are sometimes rough on the surface, caused by the action of sand while the resin is in a soft state. The trees grow in the neighborhood of the seashore, and the resin exuding trickles down and buries itself in the sand beneath. This roughened surface, called at Zanzibar “goose-skin,” is, of course, found only on the resin which has been buried, but the distinguishing characters of the resins themselves are so well known as hardly to need mention; what we are chiefly concerned about is to know how many distinct plants furnish the Copal of commerce.

Lieut.-Col. Playfair, H. M. Consul at Zanzibar, has recently transmitted to the Kew Museum, in answer to a request of the late Sir W. J. Hooker, some fine specimens of the bark of a tree

with the resin *in situ*, together with fruits of the same plant, and various specimens of collected resin. On the bark the resin is thickly formed in large irregular masses; the external appearance is of a dusky grey, but its fracture is of a clear light shining yellow. The tree yielding this resin, Col. Playfair thinks, is the true Copal of the mainland of Zanzibar; this is an announcement of some importance, in support of which we anxiously look for further confirmation. Believing, however, the fruits to be what Colonel Playfair sends them for, viz., the fruits of the Zanzibar Copal tree, there seems to be little doubt, on comparing them with specimens in the Kew Herbarium, that they belong to *Hymenæa mossambicensis*, Kl. Col. Playfair says in his report to the Foreign Office, in answer to Earl Russell's inquiries respecting the supply of resin, that the value of copal exported from Zanzibar amounted during the year 1863-4 to 163,353 dollars, the average price being about six pounds for one Austrian dollar. The sums were made up as follows:—

United Kingdom . . . . .	\$30,030
British India . . . . .	50,044
Kertch . . . . .	500
United States . . . . .	5,000
Hamburg . . . . .	30,000
Italy . . . . .	2,339
Total, . . . . .	<hr/> \$163,353

If, therefore, a revenue like this is derived from the resin of this particular plant in Zanzibar, it would be well if Madagascar, where the plant likewise grows, could open up a similar traffic in the same commodity.

Captain Burton says of the Zanzibar Copal tree, that out of its trunk "canoes have been formed 60 feet long, and that a single tree has sufficed for the keelson of a brig; the average size, however, is about half that height, with from 5 to 6 feet girth near the ground." The trunk "is dotted with exudations of raw gum, which is found scattered in bits about the base." The resin is also found in a semi-fossil state, sometimes in places overflowed by the high tides, or when sinking piles for huts, etc.

Captain Burton further says that "the East African seaboard from Ras Goman in S. lat.  $3^{\circ}$  to Ras Delgado in  $10^{\circ} 41'$ , with a medium depth of 30 miles, may be called the Copal Coast."

At Zanzibar the resin is sifted and cleansed from impurities before it finds its way into the hands of the foreign merchants; after this it is again cleansed by washing in chemical solutions of various degrees of strength, care being taken to thoroughly purify, but at the same time not to injure the so-called "goose-skin," or the impress of the sand.

All parts of the plants of the copal-yielding species of *Hymenæa* are highly charged with resin, and in none is it more apparent than in the fruits of the species sent home by Colonel Playfair. The little warts or verrucosities upon the surface of these pods are lumps of clear, colorless resin, simply covered with the thin epidermis or cuticle of the pod. To such an extent are these pods charged with resin, that they burn freely upon the least approach of flame. The same property is observable in the pods of the South American species, *Hymenæa Courbaril*, from the trunk of which exudes very large quantities of resin; but this pod being larger and mere ligneous, and the resin distributed in small ducts all over the surface without penetrating the substance of the pod, does not burn so readily, nor is the quantity of resin so large. The outside of these pods much resembles in appearance the sand-fretted surface of the resin.—*Lond. Pharm. Journ.*, from *Gardners' Chronicle*.

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## ON PRODUCING HIGH TEMPERATURES BY MEANS OF COAL GAS AND AIR.

By M. TH. SCHLÆSING.

Chemists have not as yet derived from coal gas all the advantages as a source of heat which it is capable of affording. The apparatus used in laboratories gives, at most, the temperature of white heat, unless the air is replaced by oxygen, as is done by MM. H. Sainte-Claire Deville and Debray. By ascertaining the temperature produced by gas burnt with an exactly sufficient quantity of air, and that produced simply by the flame of a jet,

the possibility of producing high temperatures by its simple combustion in air is proved. It is a question of apparatuses, which I propose to resolve as follows:—

I considered that there were two principal conditions to be fulfilled: 1. Combustion, without excess of air or gas, effected entirely in the space to be heated; 2. Sufficiently rapid supply of the burning gases to keep up the high temperature, in spite of the losses by the casings, or any other expenditure of heat. With respect to this second condition, in most of the operations requiring a high temperature, the loss of heat through the casings is the chief cause of cooling, and it is in proportion to their size; hence the advantage of large furnaces over small ones—taking into account only the better employment of the heat.

These two conditions I found to be realized by the following arrangement:—Air is forced into a copper pipe of from three to four decimetres long, through a tube running a few centimetres into the pipe; two opposite holes are pierced into the pipe a little behind the orifice of the tube; at this point the pipe is surrounded by a muff supplied with gas, which is drawn into the current of air, and becomes mixed with it. The action of this apparatus cannot be better described than by supposing a Bunsen's jet with the air, and the gas entrances reversed, the gas entrance much enlarged and admitting air, and the air holes admitting gas. The delivery of gas is of course regulated by a cock, that of the air by a given pressure. On igniting in the air the gaseous mixture thus produced a large blue flame is the result, the heat of which does not appear to be more intense than that of an ordinary blowpipe of equal expenditure; but if the jet penetrates a refractory envelope, without taking the outer air with it, the flame, which I suppose to be produced by a mixture, in theoretical proportions, of gas and air, becomes very short, and the combustion takes place entirely in a confined space; this is doubtless caused by the previous condition of the mixture of fluids, due to their simultaneous entrance into the same pipe. It does not follow that this mixture of explosive gases is dangerous. In fact, from the researches made both by M. Demondésir and myself, on the combustion of gaseous mixtures, it has been found that the velocity

with which combustion is propagated in a large tube, is for the theoretical mixture of gas and air, not more than five metres the second. If, then, the speed of supply in my blowpipe is notably greater, the flame would not be able to back so as to burn in the interior of the pipe. Moreover, an explosion under such conditions need cause no alarm. Nor need any attention be paid to the fan furnishing the air, pressures of from fifteen to twenty centimetres of water being quite sufficient; but great care must be taken to provide for the escape of the products of combustion.

I use M. Enfer's bellows, which I regulate by conveying the current into a kind of gasometer formed by a large receiver fixed in an outer cover filled with water, a guage indicating the pressure. The gas is regulated by a cock, the key of which is provided with a long handle, so that very slight movements may be made. The mixture is at its highest point of perfection when two very slightly different positions of the cock give by turns oxidizing and deoxidizing gases, which can be ascertained by applying a large copper wire to the entrance of the furnace.

To heat a porcelain tube to white heat I fix at the end of the blowpipe a kind of flattened funnel, which transforms the cylindrical jet into a sheet of flame; I place the edge of the funnel between two refractory bricks bound together by iron-wires, one of them having been filled so as to make after its junction with the other a vacant space, forming the continuation of the funnel, and in which the gaseous sheet spreads out until it escapes through an opening from 11 to 18 centimetres long and from 2 to 3 millimetres broad; it is only after thus escaping, and provided its velocity is greater than that above mentioned, that it burns. I avoid exposing my tube too near the escape, as the porcelain would be melted wherever struck directly by the flame. At each side and at the two ends of the aperture I place four pieces of brick, confining the flame in a space from one to two centimetres broad by from five to six high. A little above I place my tube, and cover it with some conveniently-shaped pieces of brick; the lighted gases divided by the tube surround it and reunite above to escape by a longitudinal aperture. The heating should of course be gradual from the first. I commence by admitting very little air, then slowly open the gas cock until the limit at which

the mixture of air and gas is inflammable is barely exceeded. In spite of the excess of air the combustion is then very incomplete; the hydrogen burns, but the carbon only forms oxide; the temperature is then very slightly raised, and the tube bears it without injury. Little by little I increase the air and the proportion of gas, until in about five minutes I arrive at the desired speed.

For heating a crucible I make other arrangements: placing two bricks flatwise together, to form the pedestal of the furnace, in the centre I place the crucible on a cheese; for which I make a verticle covering with pieces of brick of equal size bound together with an iron wire. This covering rests on four blocks, so arranged as to have between it and the pedestal a free space of three to four millimetres. This verticle envelope I cover with a brick pierced through the middle to receive my blow-pipe. Thus I heat from above, the flame strikes the cover, spreads over, descends, and escapes all around by the circular outlet made by the blocks.

It is possible to vary in many ways the form of the flame and that of the coverings, according to the object to be heated. Surprising results are produced by this mode of heating. I once melted, in twenty minutes, in a Paris crucible, a piece of iron weighing 400 grammes, and, in the same length of time, the porcelain of a Bayeux tube was transformed into transparent glass. Nor is the consumption of gas excessive. I have estimated it approximately, and found that, to heat to white heat during twenty minutes, a porcelain tube, of twenty millimetres by eighteen centimetres long, about 250 litres of gas were consumed; while from 400 to 500 were required to melt a piece of iron. The danger of melting porcelain tubes necessitates some precautions. I place at one end a flask with the bottom blackened, and through this I watch the effects of the heat on the porcelain; the flask is tubulated when the gas is required to circulate in the tube. On the first appearance of any distortion in the tube I diminish the current. With a blow-pipe and a furnace with tubes, the pressure of air corresponding to the commencement of fusion of porcelain should be ascertained, and the temperature kept below that point. This pressure limit is evidently

variable, according to the dimensions of the blow-pipe and furnace. It is, of course, advisable to increase as much as possible the diameter of the former, so as to diminish the bellows' work, bearing in mind that the velocity of the gaseous mixture has a low limit, which must not be exceeded.—*Lond. Chem. News*, March 2, 1866, from *Comptes Rendus*, lxi. 1131.

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## PIMENTO.

As Pimento is included in the *Materia Medica* of the *Pharmacopœia*, the following particulars respecting its cultivation, given by the correspondent of the leading daily paper, may interest our readers:—

“Out of Mincing-lane and the offices of colonial brokers few English people know much about pimento. Yet it ranks third among Jamaica exports, and, next to sugar and coffee, makes the most important figure in the island cultivation. Jamaica enjoys a monopoly of this product. Every attempt to carry the seed to St. Domingo and Cuba, and to propagate it there, has failed, and though the tree is found in Yucatan the fruit is not exported thence. In English households the berry is known by its familiar name of ‘allspice,’ here it is called ‘Jamaica pepper,’ but, in the language of price currents and of commerce, it is always pimento. A visit to a pimento ‘walk’ in the mountains, about ten miles from Kingston, enables me to see something of the mode of cultivation.

“This mountain estate comprises about 800 acres, on which, apart from its chief produce, nearly every tropical fruit and vegetable that one can mention grows in profusion. No large properties adjoin it, but close by are numerous negro settlements, which enjoy the same advantages of temperate climate and fruitful soil. Oranges, limes, lemons, grape fruit, shaddocks, bread fruit, plantains, bananas, cocoa-nuts, the cabbage palm, sugar cane, coffee, with yams, cassava, arrowroot, and ground provisions in an endless variety, thrive here. The pimento-trees, which yield the staple produce, grow in hundreds. It is a white-trunked, shapely-tree, not unlike in shape and growth an English apple-tree, but with a thicker, richer foliage and dark, glistening

leaves, aromatic like its fruit, and resembling those of the myrtle. It is, in fact, a tree of the myrtle tribe. The trunk is white, because every year the bark strips. Nature seems to have intended that some useful purpose should be served by the bark, but hitherto it has not been made available commercially. The tree blossoms twice, but only bears once a year; the blossom that holds and sets to the fruit appears in April. A sprig or two of the white, fragrant flower was to be seen now. It had the unmistakable 'allspice' smell, and when the whole 'walk' is in blossom, the air must be laden with rich, aromatic perfume. The berry grows to the size of a black currant, and is ready for picking about the last week in July. It must be green when picked, for if allowed to ripen it loses its aromatic properties and becomes sweet instead of spicy. After being rubbed from the stalks and dried in the sun, it becomes a rich brown, and when passed through a fanner, is bagged and ready for shipment. The term sometimes used to denote the in-gathering of the crop is not picking, but 'breaking,' because with each cluster of berries a portion of the branch is broken off, the tree thriving all the better for the spoliation. The crop is a very variable one, and sometimes fails altogether. But the tree costs nothing in cultivation, and the walk is always laid out in grass, like an English orchard. On the other hand, pimento, like sugar, has decreased much in value of late years. It used to be worth 6d., or even 1s. a pound, but at this moment fetches only 2½d. to 3d. Misfortunes never come singly, and poor Jamaica has certainly had a run of ill-luck in late years.

"Before the war with Russia there was a large demand for pimento from that country for use in spiced bread; but during the blockade it was found that a tree growing on the banks of the Amoor yielded a bark which, when grated, was pungent enough to supply the pepper, and aromatic enough to yield the spice, and the Russian market was thus lost. So pimento growers, like sugar growers, despond; though, enjoying a monopoly of production, they cannot complain that they have to sustain an unfair competition with slave labor."—*Chemist and Druggist*, March 15, 1866.



## THE FORMATION OF ACETYLENE IN INCOMPLETE COMBUSTIONS

BY M. BERTHELOT.

Acetylene is formed, as I have already proved, at the expense of most organic compounds when submitted to the prolonged influence of a red heat. I now purpose showing the formation of this same carbide under a condition not less general—namely, incomplete combustion.

The following is a general experiment proving this fact either with gas or with very volatile liquids:—

Take gas such as ethylene,  $C_2H_4$ ; hydrochloric ether,  $C_2H_5Cl$ ; propylene,  $C_3H_6$ ; methylic ether,  $C_2H_5(C_2H_5O_2)$ ; marsh gas,  $C_2H_6$ , &c.; or, better still, a very volatile liquid, such as ordinary ether,  $C_4H_{10}(C_4H_{10}O_2)$ ; amylene,  $C_{10}H_{16}$ ; hydride of amylene,  $C_{10}H_{12}$  and even benzole,  $C_{12}H_6$ ; acetone,  $C_6H_6O_2$  methylformic ether,  $C_2H_5(C_2H_5O_4)$ , &c.

Fill a test-tube of 300 cubic centimetres capacity with gas, or pour into it a few drops of volatile liquid; then add a few cubic centimetres of ammoniacal cuprous chloride, set fire to the combustible vapor, and incline the tube almost horizontally, rolling it about, so as to spread the cuprous reagent over all the interior; cuprous acetylide will speedily be produced. It is produced by the contact of the flame from beneath, and is seen in the form of a characteristic red precipitate.

This experiment answers especially well with ordinary ether and hydride of amylene.

The amount of acetylene produced under these circumstances in the form of acetylide is evidently larger than that produced under the influence of heat alone, acting on the same compounds. The quantity of acetylene actually produced is, moreover, much greater than that which takes the form of acetylide, because the greater part of the acetylene burns almost as soon as formed, and without coming in contact with the reagent. I think it possible to deduce from this experiment, conveniently modified, a method of preparing acetylene more advantageous than those hitherto in use.

Coal gas is no exception to this general rule, as may be easily

ascertained by observing the traces of acetylene it contains in its normal state.

I have, on the contrary, obtained no result, either with a mixture of oxide of carbon and hydrogen or with hydrogen charged with pure carbon dust, or directed in a jet on a stick of retort coke.

Not only is acetylene formed during combustion, in a half covered vessel of hydrocarbonated compounds, but it is produced and discharged into the atmosphere whenever an organic compound burns in contact with the air with formation of lamp-black.

This may be seen by placing the mouth of a tube over the flame, far enough off not to interfere with the combustion, and by drawing away the gases produced by the aid of a slow flow of water (one or two litres per minute). A dry, empty flask, of about a litre, is thus filled by displacement with the gases of the combustion. After several minutes, put into the flask a few drops of ammoniacal cuprous chloride, and the characteristic precipitate will be produced, though much less abundantly than in a half covered vessel. I have especially obtained this result by burning the following bodies in a small capsule:—Ordinary ether; benzole,  $C_{12}H_6$ ; oil of turpentine  $C_{20}H_{16}$ ; petroleum; vegetable oil; stearic acid, naphthaline,  $C_{20}H_8$ .

The results given by benzole and naphthaline merit attention from the fact that I have hitherto failed to transform these carbides into acetylene by heat alone. This is another proof of the extreme stability of acetylene, particularly when mixed with a certain portion of foreign gases.

The same observations are applicable to the combustion of coal gas. The gases discharged into the air, whether by the flame of a burner known as the bat's-wing, or by the smoky flame of one of Bunsen's burners, contain a notable proportion of acetylene.

These observations will explain the odor observable in rooms where gas is burnt. However, acetylene in the air exercises, by itself, no specially pernicious physiological action; for I have ascertained, by an experiment in which M. Arm. Moreau was kind enough to join me, that its poisonous action is not more marked than that of ordinary carbides of hydrogen. But its presence is an evidence of incomplete combustion; such a com-

bustion should produce a considerable proportion of carbonic oxide, to the injurious properties of which M. Leblanc has testified.

From the point of view of the theory of combustion, the general formation is not without interest. In the first place it is contrary to the positive axiom that the whole amount of the hydrogen of hydrocarbons is completely burned during incomplete combustion, leaving free carbon.

Now in the imperfect combustion of naphthaline, a body much less hydrogenized than the acetylene  $C_4H_2$ , which it engenders, it must be admitted that a portion at least of the original carbide loses its carbon before its hydrogen— $C_{20}H_8 = 4C_4H_2 + C_4$ .

In fact, the combustion of hydrocarbonated bodies is not effected at once, but by a series of decompositions. The first of these decompositions causes the formation of special products, depending on the particular nature of the combustible bodies; the first product of the incomplete combustion of alcohol, for instance, is aldehyde. Then come the general products, formed during all combustions and preceding the water and carbonic acid. Carbon and carbonic oxide are the only two general products of this nature hitherto known; to these my experiments have added acetylene.—*Chem. News*, Feb. 16, 1866, from *Comptes Rendus*, lxii., 94.

#### APPEARANCES OF GOOD AND BAD MEAT.

Dr. Letheby, in a report on the cattle plague, gives the following characters of good and bad meat, which are especially interesting at the present time :—

“ Good meat is neither of a pale pinkish color nor of a deep purple tint. The former is indicative of disease, and the latter is a sign that the animal has died from natural causes. Good meat has also a marbled appearance from the ramifications of little veins of intercellular fat; and the fat, especially of the internal organs, is hard and suety, and is never wet; whereas that of diseased meat is soft and watery, often like jelly or sodden parchment. Again, the touch or feel of healthy meat is firm and elastic, and it hardly moistens the fingers; whereas that of dis-

eased meat is soft and wet,—in fact, it is often so wet that serum runs from it, and then it is technically called wet. Good meat has but little odor, and this is not disagreeable; whereas diseased meat smells faint and cadaverous, and it often has the odor of medicine. This is best observed by cutting it and smelling the knife, or by pouring a little warm water upon it. Good meat will bear cooking without shrinking, and without losing very much in weight; but bad meat shrivels up, and it often boils to pieces. All these effects are due to the presence of a large proportion of serum in the meat, and to the relatively large amount of intercellular or gelatinous tissue; for the fat and true muscular substance are to a greater or less extent deficient. If, therefore, 100 grains of the lean or muscular part of good meat are cut up and dried at a temperature of boiling salt and water (224° Fahrenheit), they lose only from 69 to 74 grains of their weight; but if diseased meat is thus treated, it loses from 75 to 80 per cent. of its weight. I find that the average loss of weight with sound and good beef is 72·3 per cent., and of mutton 71·5 per cent., whereas the average loss of diseased beef is 76·1 per cent., and of diseased mutton 78·2 per cent. Even if it be dried at a higher temperature, as at 266° Fahrenheit, when all the moisture is expelled, and when good meat loses from 74 to 80 per cent of its weight, the proportion of loss in bad meat is equally as great. Other characters, of a more refined nature, will also serve to distinguish good from bad meat. The juice or serosity of sound flesh is slightly acid, and it contains an excess of potash salts, chiefly the phosphate; whereas diseased meat, from being infiltrated with the serum of blood, is often alkaline, and the salts of soda, especially chloride and phosphate, abound in it. Lastly, when good meat is examined under the microscope, the fibre is clean and well-defined, and free from infusorial creatures; but that of diseased meat is sodden, as if it had been soaked in water, and the transverse markings are indistinct and far apart; besides which, there are often minute organisms like infusorial bodies. These are very perceptible in the flesh of animals affected with the cattle plague, and Dr. Beal has described them as entozoa-like objects. They differ altogether from the parasites which constitute the trichina disease, and the measles of pork. How

far the use of diseased meat affects the human constitution is unknown. In those cases where certain parasitic diseases exist in animals, there is no doubt of its injurious nature; for the tapeworm, the trichina, and certain hydatid or encysted growths are unquestionably produced by it. Experience also points to the fact that carbuncle and common boils are in some degree referable to the use of the flesh of animals affected with pleuro-pneumonia; and occasionally we witness the most serious diarrhoea and prostration of the vital powers after eating diseased meat. It is, therefore, safest to forbid its use; and it is at all times best to guard against the possibility of injury by having meat well cooked. It should be so cooked that the very centre of the joint should be exposed for some time to the temperature of  $212^{\circ}$  Fahrenheit. The instructions of Liebig in this particular are hardly safe; for although a temperature below that of boiling water may coagulate albumen and develop the flavors of cooked meat, it may not ensure the destruction of dangerous parasites. It is therefore better to have the meat a little overcooked than otherwise."—*Lond. Pharm. Journ.*, March 1, 1866, from *Chem. News*.

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#### PREPARATION OF IODIDE OF POTASSIUM.

Fuchs places 100 parts of iodine in a porcelain dish with 260 parts of distilled water, and adds thereto 75 parts of pure carbonate of potash and 30 parts of iron filings. The mixture is well stirred together, and allowed to stand. The action proceeds slowly by itself, but is hastened by the application of heat. When the evolution of carbonic acid has ceased, the mixture is evaporated to dryness with continual stirring. It is better to allow the mixture to stand for some time in a lukewarm drying oven until all the iron is peroxidized, and then evaporate to dryness. The dried mass is then placed in an iron vessel and heated to a dull redness. The residue is then extracted with the smallest quantity of distilled water; the solution, which has usually an alkaline reaction, is then saturated with hydriodic acid, and set aside to crystallize.—*Chem. News*, Dec. 22, 1865, from *Dingler's Polytech. Jour.*, Bd. 177, s. 251.

## NOTE ON THE PURIFICATION OF PLATINUM.

BY MR E. SONSTADT.

The tendency of platinum to alloy with other metals at a temperature far below its fusing point is sufficiently well known to every user of platinum crucibles. It is equally well known that iron, &c., which has been absorbed by platinum, cannot be removed, except superficially, by the action of hydrochloric acid for instance, nor even by heating in acid sulphate of potassium. Stas, in his memoir on the atomic weight of silver, &c., states that he purified his platinum vessels from iron by causing them to come in contact, at a red heat, with the vapor of chloride of ammonium. The process had to be repeated as often as any yellow sublimate was formed. This process is less effectual, or less conveniently and speedily effectual, than the modification of it that I have to propose; because if the vapor of the sal ammoniac is generated from the solid salt in the vessel to be purified, the heat absorbed in the vaporization of the salt tends to keep the vessel at a temperature below that at which volatile metallic chlorides are most readily formed. Instead of chloride of ammonium, I put dry double chloride of ammonium and magnesium in the platinum vessel intended for purification. The vessel is then heated to about the fusing point of cast iron for about an hour. I find a Gore's furnace convenient for this purpose. In this process, not only is chloride of ammonium vapor given off for a long while with the double salt, at a temperature much above that at which chloride of ammonium alone volatilizes, but when that salt is completely expelled, the chloride of magnesium remaining is perpetually decomposed with evolution of free chlorine, and, frequently, the formation of a crystalline crust of periclase lining the crucible. Platinum thus purified is softer and whiter than ordinary commercial platinum. The method is not available solely for the removal of iron, but retrieves crucibles that have become dark colored and brittle from exposure to gas flame, as well as crucibles that have been attacked by silicates during fusion of these with carbonate of sodium. I cannot conclude this note without remarking on the extreme facility with which platinum becomes impure by heating in contact with matters containing only a very small proportion of substance capable

of attacking the metal. Thus, a platinum crucible becomes sensibly impure after prolonged ignition at a high temperature, bedded in commercial magnesia. On the other hand, I have kept a platinum crucible at a constant weight to the tenth of a milligramme over a series of intense ignitions, when the precaution has been taken to bed it in chemically pure magnesia.—*Chem. News*, March 30, 1866.

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## NEW PROCESS FOR INDIGO DYEING.

BY M. J. C. LEUCHS.

Before it can be used for dyeing, indigo must be rendered soluble in alkaline and caustic solutions by being treated by a reducing body; by this reaction indigo loses its color, but after being fixed on stuff and exposed to the air it absorbs fresh oxygen and returns to its original color. This process, theoretically so simple, is practically complicated by serious difficulties, and requires, on the part of the dyer, much practice and great dexterity. Thus, for instance, with indigo reduced by fermentation with vegetable matters in a caustic solution, the various acids produced during the fermentation combine with the alkali, the liquid soon ceases to be caustic, and loses the property of dissolving the reduced indigo. To remedy this a fresh quantity of alkali (soda, potash, or lime,) must be added from time to time; but should an insufficient quantity be added, a portion of the reduced indigo remains undissolved, and soon decomposes under the fermenting matter. If, on the contrary, an excess of alkali be added, a certain quantity of white indigo is lost by its combining with potash, and forming an insoluble product.

According to M. Leuchs (of Nuremberg), all these objections are obviated by effecting the change from blue to white indigo by pectine. Pectine exists in considerable quantities in the turnips of different species, in pumpkins, melons, &c.; it may be extracted from these fruits, or they may even be directly used to reduce indigo. The most simple process consists in heating 45 or 50 kilogrammes of the caustic ley to 75° C., adding half a kilogramme of well pulverized indigo, then suspending in the vat a kind of basket of iron wire, containing from 8 to 10 kilogrammes of fresh

turnips, cut into small pieces. Then heat gradually to boiling point; the indigo soon loses its color, and the solution, decanted into special vats and diluted with water freed from air, will be ready for dyeing purposes. Contact of air must of course be, as far as possible, avoided.

When the dye bath is exhausted it may serve for a fresh operation by adding indigo, a little caustic soda, and boiling it as above with a certain quantity of turnips.

On the iron wire trellis there will remain hardly 5 or 6 per cent. of the original quantity of turnips. This residue may be used in paper making.

The simplicity of this new process may easily be proved by introducing into a closed tube a small quantity of indigo mixed with a few drops of soda or caustic potash, adding a small piece of turnip and boiling; the indigo will rapidly lose its color, and re-dissolve and return to its original color by exposure to the air.

As turnips are not everywhere cultivated, and during certain seasons are not to be procured fresh, the author has found that the active principles may be extracted by boiling the turnips with water, under a pressure of two or three atmospheres. C. Leuchs and Co., of Nuremburg, now manufacture on a considerable scale an extract of turnips, 1 kilo. of which will dissolve cold 4 kilos. of indigo.—*Chem. News*, March 30, 1866, from *Bulletin de la Société Chimique*, February, p. 153.

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#### NOTE ON SULPHOCYANIDE OF AMMONIUM.

BY FRANK CLOWES.

Whilst engaged in purifying the above-named salt by several crystallizations from its aqueous solution, I happened to observe that some water hanging in drops from the bottom of the vessel, froze; on applying my hand to the vessel I found it to be intensely cold, and in a short time the atmospheric moisture was deposited like hoar frost on the sides of the vessel.

This led me to try a few experiments with weighed quantities of water and of the salt; from a few trials with different proportions, it appeared that the mixture of equal parts by weight gave



the most intense cold. By mixing 1386 grains of the salt with its weight of water at 17° C., a cold of (—12°) C., was obtained; the temperature of the atmosphere at the time of the experiment was the same as that of the water employed.

This method of producing cold could hardly be advantageous in a practical point of view, on account of the somewhat costly nature of the sulphocyanide; but it may be interesting to the scientific chemist as another example of a property which is known to be possessed by several other saline bodies.—*Chem. News*, Feb. 16, 1866, from *Museum of Irish Industry*, January 26.

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#### MEDICAL PURVEYING FOR THE U. S. ARMY DURING THE LATE WAR.

We have taken some pains to gain information of a reliable character in relation to the Pharmacy of the late war, but on several occasions have been met by objections on the part of those in authority. As it is facts, and not mere outlines or opinions, that are desirable, we propose to put on record some of the official statements as they become accessible, hoping that, before long, we shall be able to give some account of the army laboratories and their working during the period when they were in full operation. The following extract from a "Statement" issued by Surgeon R. S. Satterlee, Medical Purveyor, U. S. A., at New York, will give some idea of the amount of drugs and medicines supplied from a single depot to the army during four years and three quarters. The list contains only the drugs and medicines, dressings and hospital stores, as we have not space for the other supplies which came under the head "Surgical Instruments," medical books, record books, stationery, hospital clothing, bedding, furniture and appliances, and miscellaneous articles. The moneys expended by Surgeon Satterlee in purchasing all the supplies, and for services of contract surgeons, nurses, etc., during the period mentioned, amount to the large sum of \$18,086,569.31, of which \$753,184.91 were in 1861, \$2,779,635.21 in 1862, \$3,420,334.33 in 1863, \$6,472,498.41 in 1864, and \$4,660,916.45 in 1865. We hope to be able to get a report of the medical purveying at Philadelphia during the same period.—ED. AM. JOUR. PHARM.

MEDICINES,			
Acid, Acetic.....lb.	3,101	Permanganate of Potassa bot.	7,358
“ Arsenious.....oz.	778	Dover's Powder.....lb.	7,448
“ Benzoic.....oz.	492	Ether, Pure.....lb.	19,848
“ Citric.....lb.	6,754	Extract, Belladonna.... oz.	9,105
“ Hydrocyanic.....oz.	102	Colocynth, Comp.....lb.	3,934
“ Muriatic.....lb.	4,307	Gentian.....lb.	36
“ Nitric.....lb.	2,214	Hemlock.....oz.	2,514
“ Phosphoric, Dilut.....lb.	1,906	Extract, Henbane..... oz.	5,391
“ Pyroligneous.....lb.	28	Hops.....oz.	175
“ Sulphuric.....lb.	2,097	Nux Vomica.....oz.	4,841
“ “ Aromatic.....lb.	8,483	Fluid Extract—	
“ Tannic.....lb.	2,355	Aconite Root.....lb.	3,139
“ Tartaric.....lb.	5,565	American Hellebore.....lb.	10,042
“ Water, Oak Orchard bot.	192	Black Pepper.....oz.	64
Alcohol, Strong.....qt. bot.	131,854	Buchu.....lb.	4,215
Alum.....lb.	6,918	Colchicum Root.....oz.	546
Ammonia, Carbonate of.....lb.	5,647	Seed.....lb.	3,114
“ Muriate of.....lb.	2,743	Columbo.....lb.	169
Assafoetida.....lb.	808	Dandelion Root.....lb.	304
Balsam Peru.....lb.	1,244	Ergot.....oz.	5,399
Bibron's Antidote to the		Foxglove.....oz.	101
Poison of Serpents.....bot.	522	Gentian.....lb.	4,186
Beeswax, White.....lb.	3,815	Ginger.....lb.	14,181
Bismuth, Subcarbonate of.....lb.	972	Henbane.....oz.	752
Subnitrate of.....lb.	686	Ipecacuanha.....lb.	3,479
Blackberry Juice, Con-		Jalap.....oz.	211
densed.....lb.	960	Peruvian Bark.....lb.	10,165
Bromine.....oz.	3,107	Pinkroot.....lb.	1,811
Brandy.....qt. bot.	149,376	Quassia.....oz.	241
Burgundy Pitch.....lb.	537	Rhubarb.....lb.	2,920
Calomel.....lb.	756	Sarsaparilla.....lb.	973
Camphor.....lb.	11,257	“ Comp.....lb.	25
Cardamon Seed.....oz.	1,576	Seneka.....lb.	4,671
Catechu.....lb.	1,865	Senna.....lb.	483
Cinchonia, Sulphate of.....oz.	115,013	Valerian.....lb.	2,150
Citrate of Iron and Quinine oz.	27,819	Wild Cherry Bark.....lb.	4,116
Ammonia oz.	37	Flaxseed.....lb.	24,575
Chalk, Prepared.....lb.	4,745	Gum Arabic.....lb.	1,560
Chloroform.....lb.	28,313	Glycerin.....lb.	6,983
Collodion.....oz.	3,110	Hops.....lb.	71
Congress Water.....bot.	641	Honey, Clarified.....lb.	541
Copaiba.....lb.	25,853	Iodine.....oz.	28,000
Copper, Sulphate of.....lb.	1,478	Iron, Hydrated Oxide of,	
Creasote.....oz.	30,927	(materials for,).....pkgs.	1,110
Cubebs, Oleo-resin of.....lb.	2,926	Iron, Iodide of.....oz.	71
Disinfecting Powder.....lb.	35,148	Plaster.....lb.	45
Disinfectant—		Sulphate of.....lb.	6,932
Carbolic Acid.....boxes	100	Lead, Acetate of.....lb.	4,623
Chloride of Lime.....lb.	85,726	Lime Juice.....gal.	305
Chlorinium, (materials for		“ “.....bot.	3,500
preparing).....packages.	2,591	“ Water.....lb.	141
Chlorinium, (salt mixture		Liquorice.....lb.	11,122
for,).....lb.	3,270	Lupuline.....oz.	179
Solution of Chlorinated		Magnesia.....oz.	26,096
Soda.....lb.	60,346	Sulphate of.....lb.	182,350
Solution of Chloride of		May-Apple, Resin of.....oz.	3,519
Zinc.....lb.	7,150	Mercurial Pill Mass.....oz.	91,139
Permanganate of Potassa lb.	10,683	Plaster.....lb.	31
		Mercury, Corrosive Chloride oz.	3,978

Mercury, Iodide of.....oz.	1,765	Potassa, Acetate of.....lb.	1,597
Red Oxide of.... oz.	2,809	Bicarbonate of.....lb.	6,193
with Chalk.....lb.	1,142	Bitartrate of..... lb.	4,395
Morphia, Sulphate of.....oz.	9,161	Chlorate of.....lb.	6,855
Myrrh.....lb.	41	Nitrate of.....lb.	2,473
Ointment, Cantharides.....lb.	4,104	Potassium, Cyanuret of....oz.	31
Carbonate of Zinc lb.	747	Iodide of.....lb.	8,380
Ointment, Mercurial.....lb.	10,111	Quassia.....lb.	81
Nitrate of Mer-		Quinine, Sulphate of.....oz.	294,365
cury.....lb.	1,941	Rhubarb Root..... oz.	9,112
Ointment, Resin.....lb.	20,156	Silver, Nitrate of.....oz.	12,600
Simple.....lb.	74,190	fused.....oz.	14,538
Oil, Castor.....qt. bot.	60,176	Soap, Castile.....lb.	106,314
Cinnamon.....oz.	4,825	Solution, Arsenical, Fow-	
Cloves.....oz.	171	ler's..... oz.	35,541
Cod Liver.....qt. bot.	34,403	Solution of Ammonia.....lb.	32,363
Croton..... oz.	8,451	Morphine.....oz.	868
Cubebs.....oz.	34	Persulphate of	
Olive.....qt. bot.	43,587	Iron.....lb.	2,894
Origanum..... oz.	480	Pernitrate of	
Peppermint.....oz.	823	Iron.....oz.	97
Turpentine..... qt. bot.	27,490	Potassa.....lb.	129
Opium.....lb.	1,101	Soda, Bicarbonate of.....lb.	13,133
Elixir of, McMunn's bot.	75	Borate of.....lb.	1,432
Pills, Assafoetida.....doz.	100	Spirit of Ammonia, Aro-	
Camphor and Opium doz.	143,167	matic.....lb.	3,874
Cathartic, Comp.....doz.	197,345	Spirit of Ether, Comp.....lb.	8,803
Citrate of Iron and		Lavender, Comp.....lb.	7,535
Quinine.....doz.	2,721	Nitrous Ether..... lb.	31,734
Pills, Colocynth and Ipe-		Strychnia..... oz.	450
cacuanha.....doz.	2,728	Sulphur.....lb.	6,836
Pills, Mercurial.....doz.	1,446	Syrup of Blackberry.....bot.	1,304
Opium.....doz.	193,155	of Iodide of Iron.....lb.	2,963
Quinine.....doz.	62,483	Simple.....lb.	110
Sulphate of Cincho-		of Squill.....lb.	95,822
nia.....doz.	100	Tartrate of Antimony and	
Pulverized Aloes.....oz.	10,150	Potassa.....oz.	3,210
Cantharides.....oz.	7,109	Tartrate of Iron and Po-	
Cayenne Pepper lb.	4,500	tassa..... oz.	410
Cubebs.....lb.	8,750	Tartrate of Potassa and	
Ergot.....oz.	149	Soda..... lb.	10,578
Flaxseed.....lb.	148,084	Tincture of Aconite Root.....lb.	1,884
Gum Arabic.....oz.	229,260	American Hel-	
Guaic.....lb.	51	lebores.....oz.	968
Kino.....lb.	97	Ergot.....oz.	97
Ipecacuanha.....lb.	4,374	Foxglove.....oz.	349
Iron..... oz.	156	Iodine..... oz.	149
Jalap.....oz.	815	Larkspur.....lb.	121
Liquorice.....lb.	1,503	Muriate of Iron lb.	13,598
Mustard.....lb.	64,351	Oil of Pepper-	
Opium.....lb.	6,251	mint..... lb.	9,336
Persulphate of		Opium.....lb.	22,478
Iron.....oz.	11,243	Cam-	
Peruvian Bark.....lb.	4,790	phorated.....lb.	18,689
Rhubarb.....lb.	2,948	Peruvian Bark,	
Savine.....oz.	355	Comp.....lb.	79
Squill.....lb.	1,365	Tolu.....lb.	47
Slippery Elm		Vaccine Virus..... crusts.	24,204
Bark.....lb.	781	Whiskey..... qt. bot.	449,213

Wine, Catawba.....qt. bot.	10,468	<i>Dressings, &amp;c.</i>	
Currant.....bot.	384	Adhesive Plaster.....yds.	82,164
Port.....bot.	5,105	Binders' Boards.....no.	76,507
Sherry.....qt. bot.	191,443	Cotton Bats.....no.	23,190
Tarragona.....qt. bot.	44,980	Wadding.....sheets.	1,718
of Colchicum Seed...lb.	1,498	".....lb.	825
Zinc, Acetate of.....oz.	7,375	Flannel.....yds.	45,171
Carbonate of.....oz.	4,600	Fracture Boxes.....no.	73
Oxide of.....oz.	245	Gutta Percha Cloth.....yds.	41,623
Sulphate of.....oz.	16,235	India Rubber ".....lb.	143
		Tissue.....yds.	95
<i>Hospital Stores.</i>		Isinglass Plaster.....yds.	59,484
Ale.....casks.	440	Linen.....yds.	99,510
".....bot.	2,680	" rags.....lb.	3,593
Apple Juice, Condensed...gal.	106	Lint.....lb.	96,365
Arrow Root.....lb.	10,626	Leeches.....no.	50
Barley, Hulled.....lb.	57,631	Ligature Wire.....yds.	1,349
Beef, Extract of.....lb.	296,592	Muslin, White.....yds.	668,178
Soup, Fifty Ration		Green.....yds.	1,070
Boxes of.....no.	50	Napkins for Ophthalmia.....no.	12,316
Candles, Sperm.....lb.	41,501	Needles, 25 ; Cotton	
Cinnamon, Powdered.....lb.	2,148	Thread, 1 Spool ; Thim-	
Cloves.....lb.	197	bles, 1—in case.....no.	7,871
Cocoa and Chocolate.....lb.	53,725	Needles, Sewing.....no.	39,134
Coffee, Concentrated.....lb.	2,589	Oakum.....lb.	67,644
Extract of.....gal.	13,589	Oiled Silk and Muslin.....yds.	58,817
Condensed Eggs.....lb.	74,568	Paper.....sheets.	215
Corn Starch.....lb.	125,913	Pencils, Hair.....no.	88,244
Desiccated Vegetables.....lb.	55,108	Pins.....papers.	30,516
Egg-Nog.....cans.	514	Roller Bandages, Assorted doz.	239,765
Farina.....lb.	83,630	Suspensory, " " no.	52,329
Gelatine, Shred.....lb.	4,353	Silk, Green.....yds.	5,378
Ginger, Powdered.....lb.	2,930	Saddlers.....oz.	7,218
Ice.....tons.	1,796	Splints.....sets.	12,830
Milk, Concentrated.....lb.	254,318	Smith's Anterior...no.	8,440
Nutmegs.....lb.	5,984	Sponge, Fine.....oz.	86,611
Pepper, Black, Ground.....lb.	7,850	Tape, 8-yd. Pieces.....no.	36,383
Portable Lemonade.....lb.	1,300	Thread, Cotton.. spools.	559
Porter.....casks.	89	Linen.....oz.	19,613
".....pt. bot.	430,616	Thimbles.....no.	239
Sugar, White, Crushed.....lb.	363,596	Tow... ..lb.	20,208
Tamarinds.....lb.	260	Towel Rollers.....no.	40
Tapioca.....lb.	46,467	Towels.....doz.	38,158
Tea.....lb.	158,051	Towelling.....yds.	7,716
Tomatoes.....cans.	148	Twine.....lb.	9,578

## Annual Commencement of the Philadelphia College of Pharmacy.

The 45th Annual Commencement of the College was held, at the Musical Fund Hall, on the evening of the 17th of March, 1866, on which occasion more than the ordinary ceremonies occurred. It has become usual with the graduating class to present to their Alma Mater a portrait of one of the ex-Professors, for the Hall of the College. The ceremony of presentation is usually performed in the meeting-room below the Hall, previous to conferring the degrees. On the present occasion the Class desired

that these extra ceremonies should take place before the audience. The portrait was that of the late Dr. Gerard Troost, the first Professor of Chemistry in the College, and was presented on behalf of the graduates by Mr. R. C. Lippincott. Prof. Bridges, on behalf of the Board of Trustees, received it, and, in a short extemporaneous address, recalled many of the prominent points in the history of Prof. Troost, who was born in Holland in 1776, and died in Nashville, Tenn., in 1850, aged 75 years.

The ceremony of conferring the degree of Graduate in Pharmacy on the following gentlemen was then performed by the President of the College :

✓ ALLEN, WILLIAM E.,	Philadelphia, Pa.,	<i>Gelsemium Sempervirens.</i>
✓ BARNITZ, FRANK M.,	York, "	{ <i>How the Drug Business is, and should be conducted.</i>
✓ BLAIR, HENRY C.,	Philadelphia, "	<i>Cypripedium Pubescens.</i>
✓ BRADDOCK, ISAAC A.,	Haddonfield, N. J.,	<i>The Dawn of Chemical Science.</i>
✓ CAMPBELL, HUGH,	Philadelphia, Pa.,	<i>The Druggist's Position.</i>
✓ DOBBINS, ALBERT N.,	Mount Holly, N. J.,	<i>Cornus Florida.</i>
✓ KNEESHAW, WILLIAM W.,	Trenton, "	<i>Petroleum.</i>
✓ LAIRD, WILLIAM R.,	Reading, Pa.,	<i>Pyrethrum Parthenium.</i>
✓ LEVERING, P. WHARTON,	Roxborough, "	<i>Phloridzin.</i>
✓ LIPPINCOTT, ROBERT C.,	Philadelphia, "	<i>Rheum Rhaponticum.</i>
✓ MCPIKE, WILLIAM C.,	Alton, Illinois,	<i>The Epidermis of Carya Alba.</i>
✓ MILLEMAN, PHILIP,	Chicago, "	<i>Cunila Mariana.</i>
✓ MILLAC, JOHN A.,	Philadelphia, Pa.,	<i>Veratrum Viride.</i>
✓ NEWBOLD, THOMAS M.,	" "	<i>Sanguinaria Canadensis.</i>
✓ NEWTON, JOHN S.,	" "	{ <i>Glycerin, Ferri Pyro-Phosphas and Tolu.</i>
✓ PAINTER, EMLIN,	Delaware Co., "	<i>Liriodendron Tulipifera.</i>
✓ PILE, GUSTAVUS,	Philadelphia, "	<i>Unguentum Hydrargyri.</i>
✓ RAU, ROBERT,	Bethlehem, "	<i>Senna.</i>
✓ REMINGTON, JOSEPH P.,	Philadelphia, "	{ <i>Our "Alma Mater," its Rise and Progress.</i>
✓ RILEY, CHARLES W.,	" "	<i>Berberina.</i>
✓ ROBINSON, JOSHUA K.,	Newark, Del.,	<i>Hamamelis Virginica.</i>
✓ ROSS, H. H.,	Chester, "	<i>Water.</i>
✓ SAYRE, L. E.,	Bridgeton, N. J.,	<i>Cornus Florida.</i>
✓ SEGNER, WILLIAM,	Palmyra, Pa.,	<i>The Progress of Chemistry.</i>
✓ SHOEMAKER, ALLEN,	Philadelphia, "	<i>Sanguinaria Canadensis.</i>
✓ SHOEMAKER, BENJAMIN, Jr.,	" "	<i>Urtica Dioica.</i>
✓ SHOEMAKER, CHARLES,	" "	<i>Physostigma Venenosum.</i>
✓ SIMSON, WILLIAM H.,	Halifax, N. S.,	<i>Epigea Repens.</i>
✓ SOUDER, JOSEPH A.,	Philadelphia, Pa.,	<i>Iodoform.</i>
✓ STREHL, LOUIS,	Chicago, Ill.,	<i>Iodide of Lime.</i>
✓ WALKER, THOMAS A.,	Princeton, N. J.,	<i>Cimicifuga.</i>

The valedictory charge was delivered by Professor Procter, in the course of which he alluded to his resignation of the Professorship of Pharmacy, which was to take effect on the 1st of April.

At the close of the address, Mr. John S. Newton, on behalf of the

students of the College of Pharmacy Class 1865-6, read a series of resolutions expressive of the feelings and kind wishes of the Class towards Prof. Procter, and, on their behalf, presented him with a beautiful tea-service, as a testimonial,—to which the Professor made a brief reply expressive of his gratification at this spontaneous action of the Class.

More than the usual number of bouquets, from the lady friends of the graduates, were then distributed by Prof. Parrish, thus concluding the ceremonies of the evening, which were interspersed with music by the Germania Band.

### Minutes of the Philadelphia College of Pharmacy.

The Forty-fifth Annual Meeting of the Philadelphia College of Pharmacy was held at the College hall, on Monday evening, March 26th, 1866.

The President, Charles Ellis, in the Chair. Twenty-two members present.

The minutes of the last meeting were read and approved.

The minutes of the Board of Trustees were read by the Secretary of the Board. From these minutes the College is informed that, by the will of the late Algernon S. Roberts, the College is to receive an annual legacy of \$200 for five years. Also, that the Trustees deemed it prudent to decline an offer of \$2000 towards establishing a School of Practical Chemistry and Pharmacy, on the condition of including a permanent scholarship for two colored students.

The matriculants to the school of Pharmacy for the session of 1865-66, numbered 141.

At the Annual Commencement of the College, held on March 17th, at the Musical Fund Hall, the degree of Graduate in Pharmacy was conferred by the President on thirty-one candidates. The valedictory charge was delivered by Prof. Procter, (see page 274.)

The minutes of the Board also inform that a portrait of Prof. Troost, one of the early Professors in the College, was presented to the College by the Zeta Phi Society of the Class. Also that 31 volumes of the Journal of Pharmacy had been presented to the Harvard College Library.

A communication from the Board of Trustees, relative to the resignation of Prof. Procter, was read, accepted and directed to be entered on the minutes, as follows :

With sincere regret the Board of Trustees announce to the College the resignation of Prof. Procter from the Chair of Pharmacy in the School of this College.

On reference to the minutes of the College we find, that, at a meeting of the College held in March, 1846, a memorial was presented, accompanied by the following resolution :

*"Resolved,* That a committee of nine members be appointed to take into consideration the propriety of creating a new Professorship, to be called the Professorship of Theoretical and Practical Pharmacy ; and if they deem it expedient, to mature a plan for the consideration of the next meeting."

At the next stated meeting of the College the report of the committee was received, and the subject was referred to the Board of Trustees. "with instructions to take the necessary measures for establishing the said Professorship."

The minutes of the College take no further note of the subject. The minutes of the Board of Trustees, however, inform that at an election held by the Board at a meeting on the 1st of June, 1846, Wm. Procter, Jr., was unanimously elected to the Chair of Pharmacy.

From the above statistical information, it will be seen that the Chair of Pharmacy was established twenty years ago. The wisdom of the College in creating that chair, we think no member of the present day will doubt. How successfully and substantially its foundation has been laid by the Professor, whose twenty years of labor have now drawn to a close, the graduates of the College *assembled here* this evening will cheerfully attest.

In accepting the resignation of Prof. Procter, the Board of Trustees yielded to a knowledge of his earnest desire to lay aside the duties with which he had been so long invested. We trust that in the retrospect of his past arduous labors, our retiring Professor will find a partial repayment in the progress of the generation who have listened to his instructions, and who are now taking an active part in bringing to the test of experience the lessons received from him.

We also trust that he may live to see the work so well begun and faithfully continued by himself, expand in usefulness, and show by its fruits that *he* has not labored in vain.

CHARLES BULLOCK,  
CHARLES ELLIS,  
JAMES T. SHINN.

Theodore A. Royal having been recommended by the Board for resident membership, was on ballot unanimously elected.

John Gilbert having offered his resignation, on account of retiring from business, it was unanimously resolved to continue to him his certificate of membership and to exonerate him from further annual dues.

The resignation of Dr. W. W. H. Githens was read and accepted.

The report of the Committee on the Sinking Fund was read and accepted, and the Treasurer of the College directed to pay to the Committee such sum as they may deem expedient.

The Publishing Committee report, that the "American Journal of Pharmacy" has been issued bi-monthly, as usual, since their last report to the College. It was *then* stated that the size of the numbers had been reduced from six to *five* forms, owing to the increased cost of materials and printing, and the falling off in the number of subscribers during the war. The Committee now inform the College that the Journal has been restored to its former size, and that a considerable increase of the subscription list, more especially from southern and western sources, has occurred. They regret to say that the volume for 1865 is already out of print (from the latter cause.) They have had to print several hundred additional copies of the numbers of the current volume.

The condition of the finances of the Committee will be found in the accompanying statement of the Treasurer.

CHARLES ELLIS, ALFRED B. TAYLOR, JOHN M. MAISCH, EDWARD PARRISH, WM. PROCTER, JR.	}	Committee.
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The Committee on Latin Labels made a report of their financial condition.

Mr. Thomas S. Wiegand, President of the Alumni Association, made a verbal report on the action of the Association towards establishing a practical school of Chemistry and Pharmacy.

The annual election being ordered, the following officers were duly elected:

<i>President,</i>	Chas. Ellis.
<i>First Vice-President,</i>	S. F. Troth.
<i>Second Vice-President,</i>	D. Parrish.
<i>Treasurer,</i>	Ambrose Smith.
<i>Recording Secretary,</i>	Chas. Bullock.
<i>Corresponding Sec'y,</i>	Wm. Procter, Jr.

*Trustees.*

Dr. Robt. Bridges,	S. N. Jones,	T. M. Perot,
S. S. Bunting,	Jas. T. Shinn,	J. M. Maisch,
T. S. Wiegand,	D. S. Jones.	

*Publishing Committee.*

Chas. Ellis,	E. Parrish,	J. M. Maisch,
A. B. Taylor,	Wm. Procter, Jr.	

*Committee on Sinking Fund.*

S. F. Troth,	A. Smith,	E. Parrish.
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*Delegates to the American Pharmaceutical Association.*

Wm. Procter, Jr.,	Jas. T. Shinn,	Ambrose Smith,
Dr. Wilson H. Pile,	Wm. R. Warner.	

On motion, the College then adjourned.

CHARLES BULLOCK, *Secretary.*

## Editorial Department.

INTERNATIONAL PHARMACEUTICAL CONGRESS OF BRUNSWICK.—This International Congress, an invitation to send deputies to which was received by the American Pharmaceutical Association, (see page 47 of the Proceedings,) opened its session on the 16th of September, 1865, but was preceded by another reunion of great interest, viz., that of the two great Societies of Northern and Southern Germany, the former presided over by Dr. Bley, of Bernburg, and the latter by Dr. Riekher, of Marbach.

MM. Guibourt and Robinet, (from whose report we make the following abstract, and who had been deputed by the Society of Pharmacy of Paris to attend the International Congress,) being honorary members of the Northern Society, were invited to attend its sittings, at which nearly 200 members assisted, and which had for its object a general Society for mutual aid.



During two days, surrounded by testimonials of the highest respect, we assisted at the deliberations of this first meeting, and at the social gatherings which were its inevitable consequence. On the 16th of September the International Congress opened its sessions. The preliminary proceedings, viz., the verification of credentials and the election of the officers were directed by the venerable Dean, Dr. Bley.

M. Dittrich, the learned pharmaceutical chemist of Prague, was elected President, and M. Robinet, Vice President. The meeting accepted the proposition of the President to take for Secretaries the editors of the three principal Journals of Pharmacy published in Germany, M.M. Klinger of Vienna, Casselmann of St. Petersburg, and Dr. Vorweck of Spire.

This first meeting, in a City of Northern Germany, of an International Congress of Pharmacutists, appears to the French Delegates an event of considerable importance, and calculated to exercise a great influence on the future of the profession, and to preserve among them a grateful recollection of the zealous men who there met together.

The report gives a complete list of all the members of the Congress : three from France, nine from Russia, one from Sweden, three from Austria, three from Northern Germany, three from Southern Germany, three from Hamburg and Altona, three from Berlin and one from Saxony.

These delegates represented twelve Pharmaceutical Associations. The reporters attributed much of the success of the meeting to the devotedness of M. Herzog, of Brunswick, who acted as commissary general, and to Dr. Björklund, of St. Petersburg, who had travelled over a great part of Europe to make known the object of the Congress, and cause the appointment of delegates.

A programme had been prepared by M.M. Bley, Rieckher and Giezeler, representatives of the General Union of German Apothecaries.

Immediately after the installation of officers, the delegates formed themselves in sections in accordance with the programme, and retired to organize them by the appointment of chairmen and reporters.

On the 17th, in the morning, every one was ready. The meeting commenced by reading the reports and propositions from the sections. The reporters do not go into details in considering rapidly the actions of the Congress, and, notwithstanding the difference in usages and laws, they found among their foreign associates the same feelings, the same wishes, the same cares that have been expressed many a time at home. For instance, it was unanimously considered that the best means of elevating and sustaining the scientific position of the pharmacist, was to become more and more exacting in the requirements from students before they enter their career of practice ; that it would be proper to appoint apothecaries in larger proportion to public positions, such as in the institutions of sanitary police, medical or pharmaceutical, and that they should be placed on the same footing with Doctors of Medicine ; that it is necessary in sustaining professional dignity to discountenance all secret remedies, to suppress special homœopathic and veterinary pharmacies, etc.

On the subject recently much discussed, of a free and unlimited exercise of pharmacy, the Congress was unanimous in declaring that neither the public nor the profession desired this singular innovation.

The desire for the compilation of a universal Pharmacopœia was warmly received, and this wish is very near its realization for at least a great part of Europe. A Committee, of whom the learned M. Dankwortt is the chairman, has edited, in Latin, a universal Pharmacopœia, of which the printing is nearly finished, and of which M. Guibourt could appreciate the merit. It is evident that the best means of realizing the greatest possible unity in pharmacology is to give an example. The Pharmacopœia of M. Dankwortt has made an abstract of all the usages which require special knowledge of weights and measures, and has adopted the most rational formulas without reference to the country.

The delegates were also unanimous in asking the adoption of the Latin language and metrical system in its relations to pharmacy. But, says M. Robinet, we cannot hide from ourselves that at Brunswick as at Rennes, (the place at which the last French Congress met,) all these questions, and some others relative to the status of *élèves* (clerks,) the scarcity of young apprentices, the creation of provident institutions to aid pharmacists, all these questions were but accessories. The grand question, the real question, that which has exercised all the best minds and set in motion respectable men of sedentary habits, was that which can be called by no other name than *the question of specialities*, (secret medicines.) This was reserved for the last deliberations, after all the secondary questions were disposed of. The section charged with the treatment of this question were as distinguished as they were convincing: Dr. Björklund, of St. Petersburg, and M. Brants, of Vienna. Their written reports, inserted entire in the records of the Congress, are marked with a lively and vehement indignation. They enforce the severest blame and reprobation on the trade in secret remedies and panaceas.

M. Robinet appears to have been astonished at the demonstrative manner of his German confrères, under the excitement of debate on this agitating question, and doubts his ability to translate into French their animated discussions. His impressions of the personelle of the German members was very favorable. He describes them as exhibiting gravity, self-possession and personal distinction. All of them give assurance of having moved in the higher walks of society, and as to their knowledge and experience they are too well known in France to need praise from him. Such are the men, from one end of Europe to the other, who are so warped, worried and pressed upon by this speciality; as if their information and their prudence were insufficient to accomplish for their country the noble mission of contributing to the relief of suffering humanity. They see themselves reduced by the credulity and ignorance of the people to play a humiliating part as retailers of medicines they have not prepared, and of which, for the most part, they are ignorant of the composition. Constrained to distribute with

these drugs the directions which accompany them, they become in spite of themselves accomplices in the violation of the laws, since they are, in some degree, blind doctors and secret apothecaries. It is in vain that they contend against these crying abuses. Considerations of a kind that we cannot explain, decide the governments to permit these nostrums to be made and sold, and the legitimate complaints of our confrères beyond the Rhine are not heard.

It is to unite new forces and prepare new arms against quackery that the Congress of Brunswick has been organized.

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THE CAVENDISH SOCIETY.—Those of our readers who feel interested in the proceedings of this Society will learn by the following article, published in the Chemical News for March 9th, the prospects of the Society. We hope the suggestion that the 17th volume, now partially printed, will complete the text, and that the general index will soon follow, will prove true.

*Cavendish Society.*—The annual meeting of the Cavendish Society was held in the rooms of the Chemical Society on March 1, Mr. Graham, President, in the chair. The report, read by the Secretary, Dr. Redwood, stated that the Council had agreed to accept a proposal made by Mr. Harrison to undertake the publication of the remaining volumes of Gmelin's "Chemistry" at his own risk, supplying them to the members at one guinea each volume. Two volumes, it is anticipated, will complete the work. A considerable part of Vol. XVII. is in type, and this volume it is expected will be completed in about four months. The Council believe that the public demand for scientific works of a superior character is now so large that there is no longer any field for a publishing society like the Cavendish, and they think the operations of the Society may fitly close with the completion of Gmelin's work. In reply to some questions asked, the Secretary stated that the back stock of the Society formed part of the consideration to Mr. Harrison for undertaking the publication of the remaining volumes. There were about 300 complete sets of the organic part in stock, but no complete set of the inorganic part was left. An arrangement had been made with Mr. Harrison by which he was debarred from selling the volumes still to be issued for less than a guinea each for the next two years. The index volume is to be supplied to the subscribers *gratis*. The balance-sheet showed a sum of 183*l.* in hand, and the outstanding liabilities of the Society were said to be very small. The report was adopted by the meeting. A resolution to continue the present council and officers was also carried, as were the usual votes of thanks.

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ARTIFICIAL MINERAL WATERS.—We are informed that Mr. Eugene Roussel, who has been manufacturing mineral waters in this city for over 25 years, and whose chemical knowledge fully enables him to prepare all the various kinds of medicated waters, has now commenced manufacturing the different mineral spring waters as now prepared by Shultz and War-ker of New York, such as Carbonic Acid, Seltzer, Vichy, Kissingen, Vichy with Lithia, and Lithia Waters.

These waters are put up in glass syphons containing a quart, are strictly prepared according to the latest chemical analysis of the different springs,

have the great advantage of permitting any quantity to be drawn, from a few drops to the contents of a tumbler, and will retain an excess of carbonic acid gas to the last.

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*United States Revenue Commission. Special Report No. 5, on Distilled Spirits as a source of National Revenue, &c., Feb. 1866. Special Report No. 8, on Proprietary and other Medicines, Perfumery, etc., as a source of National Revenue, Feb. 1866. Treasury Department.*

Many of our readers are already aware that the last Congress caused the appointment of a commission called the United States Revenue Commission, for the purpose of investigating the whole subject of internal revenue, but more especially in reference to the leading sources of revenue, distilled spirits, patent medicines, coffee, cotton, tobacco, etc. They also know that at the last meeting of the American Pharmaceutical Association, a committee was appointed to endeavor to represent to this commission the great importance to Pharmacy of a reduction in the tax on alcohol, and to urge other ameliorations in the revenue laws bearing on Pharmacy. Several members of this committee have had intercourse with Commissioner Wells, who has the subjects of alcohol and medicines under his charge for examination, and the written views of every member have been submitted to him, with the report of the Chairman, and there is no doubt that the commissioners are earnestly disposed to cause the reduction of the tax on alcohol to one-half of its present rate. The Report No. 5, (as above), after detailing the arguments in favor of the present high rate of \$2 on whiskey, says,

“That these arguments are weighty, cannot be denied, and in the outset of their investigations, they seemed to the commission entirely conclusive. Deeply impressed, however, with the conviction that a thorough inquiry into this subject was of the utmost importance to the country, and determined to let no preconceived opinions or prejudices stand in the way of an impartial discharge of their duties, they instituted a most careful and laborious examination, and have sought to avail themselves of every opportunity to acquire correct information. In carrying out this design the commission have personally examined several hundred witnesses, embracing most of the leading distillers, rectifiers and dealers in spirits in the country; the representatives of various branches of American Pharmacy, and of the industrial interests into which alcohol enters as a constituent; and have sought to acquaint themselves by correspondence and otherwise with the history and detail of foreign experience and legislation on this subject. The result of this inquiry has led to a reversal of their opinion, and induces them to believe that in a *revenue, industrial and moral* point of view, it would be expedient to *reduce the existing excise of \$2 per gallon on distilled spirits, and to substitute therefor a lower rate of \$1 per proof gallon.*”

The commissioners then give their reasons for this recommendation, among which the principal one is that the experience of the older governments, in raising revenue from the spirit tax, proves that when the tax is excessive it acts as a premium on illicit distillation, and whilst the quantity *consumed* continues large, the quantity *taxed* is frequently less than a

third of this amount. Reference is then made to the action of the British government in allowing spirits to be methylated (rendered unfit for a beverage) for use in the arts, to have but a nominal duty, and of the effect of this amelioration, the British officials say "*It is scarcely too much to say that if this mixture had not been devised for the relief of our manufacturers, it would have been almost impossible to maintain the present high rate of duty.*"

The commissioners then argue that, if, in Great Britain, a country of limited area and dense population, with a thoroughly organized revenue system and police, the attempt to maintain this high rate of duty is so unsuccessful, how utterly impossible will it be in a country like the United States, with a sparse and partly disaffected population, to prevent illicit distillation being conducted on a grand scale.

The commission in order to ascertain whether it was the desire of American manufacturers, using alcohol, to have a legal provision for methylating alcohol for their use, had some of it mixed, and imported some of the English spirit so treated, and submitted them to the representatives of various branches in which alcohol is much used. The judgment rendered by these persons was unfavorable to the use of "methylated spirits."

The Report says, "In a communication made to the commission by the American Pharmaceutical Association, the memorialists urge that 'the enormous increase in the price of alcohol (twelve times its former cost) has very materially interfered with the best interests of Pharmacy, by tending to cramp and hinder the progress of the art, and materially lessen the use of alcohol by encouraging the use of imperfect and improper substitutes. This diminished use has by no means reached its limit, and it may be safely estimated for Pharmacy, that if the present high rate of duty be maintained, the use of alcohol will be diminished more than one-half. With half the present rate of duty, Pharmacy might not be seriously affected; and if so, the revenue accruing from one-half the present rate of duty would be larger and be more easily collected than from the existing rates.'"

"In common with the Pharmaceutists, it also appears to be the general opinion of a majority of the representatives of the various trade interests who have appeared before the commission in relation to this matter, that a reduction of the tax on proof spirits to one dollar per gallon would sufficiently relieve them from the injurious effects of the present high price of alcohol, and lead to a very large increase in its consumption for industrial purposes.

The commission argue that the grain producing interests of the country would be benefitted; and, finally, they ask whether it is just and expedient on the part of the Government to impose by law so high a tax on alcohol as to act as a premium for fraud, which it is morally certain human nature as ordinarily constituted, will not resist; and then, secondly, to impose severe

penalties for violation of the law; and whether the hourly provocation to perjury, evasion and concealment, held out by a \$2 tax, will not more than counterbalance any good which may result? The commission do not consider that the high tax has greatly diminished the use of spirits as a beverage, but that the use of opium and other narcotics has increased in consequence of the tax.

The newspaper reports of the proceedings in Congress, that have from time to time been presented, which throw any light on the subject, indicate a strong indisposition on the part of the Committee of Ways and Means to reduce the tax, and it seems the general impression that they will resist the recommendation of the commission, backed as it is by the mass of testimony and facts they offer. The statistical portions of this Report are quite interesting, and we hope to avail ourselves of them in a future number.

Report No. 8, relative to proprietary and other medicines, perfumery, &c., contains several recommendations which closely concern apothecaries and druggists. The *first* is an addition to paragraph 31, section 79, of the law in which manufacturers are defined, viz :

*"Provided, That apothecaries who manufacture for their own dispensing and sales to consumers and to physicians, the medicines compounded according to the United States or other national pharmacopœias, or of which the full and proper formula is published in any of the dispensatories now or hitherto in common use among physicians or apothecaries, or in any Pharmaceutical journal now issued by any incorporated College of Pharmacy, shall not be regarded as manufacturers under this act. But apothecaries, and all other persons who manufacture for the dispensing and sales of others, or who make and advertise any article, medicinal or otherwise, simple or compound, with any special proprietary claim to merit or to special advantage in use or effect, whether such claim be based on the properties, qualities, price, or any other distinctive or distinguishing characteristic, whether real or pretended, of the articles so made and advertised, whether such article be or be not made according to the authority above cited in this proviso, the maker or makers thereof shall be regarded as manufacturers under this act."*

The reasons given for this proviso are to encourage apothecaries to make their own preparations according to legal authority, and thus be better qualified to give security and bear the responsibility incurred in their sale and use. That as they pay the Government a license to carry on the business of an apothecary, they are only carrying out the business for which this license is given when they prepare the medicines they sell, and hence are not justly to be called upon to pay a manufacturer's license. But when they step aside from their duty as dispensers, and make any preparation largely for the sales of others, they become manufacturers, whether the article prepared be laudanum or cod-liver oil.

*Second.* They recommend the following addition to paragraph 33, Sec. 79, after the final word alcohol.

*"Or of dispensing, upon physicians' prescriptions the wines and spirits official in the United States and other national pharmacopœias, either simple or compound, in quantities not exceeding half a pint of either at*

any one time, nor exceeding in aggregate cost value the sum of \$300 per annum."

This clause, if adopted, will settle the vexed question as to the right of apothecaries to dispense liquors for medicinal use, and compels them to demand a physician's prescription when a sale is to be effected. The inconvenience to the people in legitimate emergencies, arising from the necessity of getting a prescription, will no doubt occasion much complaint; but after considering the whole subject, and the evils arising from the grant of a right to retail liquors to apothecaries, to be regulated by their own judgment of the necessity of the case, we are willing to submit to this inconvenience rather than make tipping shops of our pharmacies. Besides, the apothecary may now keep and sell this class of remedies without being compelled to take out a license as a liquor dealer.

*Thirdly*, The commission recommend an important change in the proviso of exemptions among stampable articles under Schedule C of the present law, viz :

"*Provided*, That nothing in this act contained shall apply to any un-compounded medicinal drug or chemical, nor to any medicine compounded according to the United States or other national pharmacopœia, or of which the full and proper formula is published in any of the dispensatories now or hitherto in common use among physicians and apothecaries, or in any Pharmaceutical journal now issued by any incorporated College of Pharmacy, and not sold or offered for sale, or advertised under any other name, form or guise than that under which they may be severally denominated and laid down in said pharmacopœias, dispensatories or journals as aforesaid; nor to medicines sold to or for the use of any person, which may be mixed and compounded, for said person according to the written receipt or prescription of any physician or surgeon. But nothing in this proviso shall be construed to exempt from stamp duty any and all medicinal articles, whether simple, or compounded by any rule, authority or formula, published or unpublished, which are put up in a style or manner similar to that of patent or proprietary medicines in general, and advertised in newspapers or by public handbills for popular sale and use as having any special proprietary claim to merit, or to any peculiar advantage in mode of preparation, quality, quantity, price, use or effect, whether such claim be real or pretended."

The changes are intended to circumscribe the books considered as authorities for exempting formulas, and especially cutting off "formularies and text books," and to define clearly what is intended by a proprietary article, showing that a mere change in the wording of a label may convert a free article into a stampable one. To illustrate this point, cod-liver oil is instanced. Any one may put up cod-liver oil, and speak of it as pure and carefully prepared, and may state that it is used in affections of the chest, with the dose; and also that it is carefully made or prepared by A. or B., and it is stamp free. But if the same oil is put up with labels stating it to be X. or Y.'s celebrated cod-liver oil for the cure of consumption, &c., &c., prepared by a peculiar process, that renders it better than other oils, etc., then it becomes proprietary and is stampable. We think this is as it should be, and hope the recommendation will become

a law, because where a man assumes this proprietary relationship to an article, he claims an advantage over those who don't see proper to take that course, and he should be willing to pay for the privilege. *Finally*, the commission recommend that the present law relative to proprietary stamps be so changed and amended, that *every ten cents value on a medicine or article shall require a one cent stamp*. So that a dollar article which now requires a four cent stamp, will need a *ten cent stamp*. But the stampable value of the article must be its retail price, *as fixed by the maker*, and this gives the maker the power to increase the price to meet the tax if he chooses. For ten cent articles the tax operates more justly than the present one; but it may be doubted whether this tax should be laid, in justice to manufacturers, if the tax on alcohol is not reduced. The reason for raising the stamp tax to ten per cent. is to reverse the unjust discrimination which now exists against legitimate Pharmacy, by making it greater than the manufacturer's tax instead of less, as it now stands.

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*Second Annual Report and Proceedings of the Alumni Association of the Philadelphia College of Pharmacy*, containing also the Valedictory Address delivered to the Graduating Class of 1866, by WM. PROCTER, JR., Professor of Pharmacy in the College. Philada., 1866.

This is a neatly printed pamphlet of forty pages, edited by the Secretary of the Alumni, Mr. William C. Bakes.

The Association met on the afternoon of the 16th of March. In the absence of the President, Vice-President Ferris Bringham took the chair. The Annual Report of the Secretary was then read and adopted. Fifteen gentlemen were elected members by ballot; a committee to nominate officers appointed; also a committee in reference to the resignation of Professor Procter; the Treasurer's report read and referred to an auditing committee, when the Association adjourned until the 17th.

March 17th. President, T. S. Wiegand in the chair. The Committee on Nominations reported the names of *T. S. Wiegand* for President, *Chas. L. Eberle* and *Ferris Bringham* for Vice-Presidents, *Wm. C. Bakes* for Secretary, *Adolph W. Miller* for Corresponding Secretary, *Alfred Mellor* for Treasurer, and Messrs. F. Gutekunst, Henry Bower, Jos. C. Kirkbride, H. N. Rittenhouse, E. C. Jones and A. Blair as the Executive Board. The President then read his address, which we have not space for. Several original communications were then read on scientific subjects, followed by discussions, particularly in reference to Wax in Cerates. The Committee appointed relative to the resignation of the Professor of Pharmacy in the College reported a preamble and resolutions, which were unanimously adopted and an engrossed copy directed to be presented to Prof. Procter.

The Auditing Committee reported that the Treasurer's Account was correct. The Secretary was instructed to edit and publish the proceedings, when the meeting adjourned.



*Descriptive Catalogue of Fluid and Solid Extracts in Vacuo*; also concentrations and officinal pills, prepared by Henry Thayer & Company. With formulas and receipts. Cambridgeport, Mass., 1866.

From the elegant manner in which this catalogue is gotten up, one might fancy it a book intended for the parlor table, being well printed on expensive paper, and handsomely bound. It is not a mere catalogue of preparations, however, having some claims that point to *Materia Medica*, and many recipes for preparations in Pharmacy; but on close examination it will be observed that, though a catalogue of fluid extracts, and a catalogue of formulas, it contains no formulas of fluid or solid extracts, and that nearly all the other preparations are made from the fluid extracts. In fact, it is the same method of advertising Mr. Thayer's fluid extracts that a few years back was practised by Tilden & Company in a similar volume. The idea is, that physicians and apothecaries will find it convenient to make the preparations of the *Pharmacopœia* from these fluid extracts, and thus save all the labor and trouble and skill required to prepare them from the drugs. Now we protest against this procedure as calculated to injure the practice of Pharmacy and lower its standard, removing from those who use these extracts for this purpose all means by which they can know the quality of the resulting dilutions. It would be some reason in its favor did we know that the preparations it advertises were made by the *Pharmacopœia* recipes, when officinal, but there is no evidence on this point. It is high time that a stand should be made against the encroachments of manufacturing Pharmacutists on the proper business of the apothecary. Apart from this tendency of the book, we have nothing against it. It exhibits great enterprise on the part of the manufacturer, and contains much information of a useful character.

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*Circular No. 6. War Department; Surgeon General's Office, Washington Nov. 1, 1865.* Reports on the extent and nature of the materials available for the preparation of a medical and surgical history of the Rebellion. Printed for the Surgeon General's Office, by J. B. Lippincott and Co.; Philadelphia, 1865.

We are indebted to Surgeon General Barnes for a copy of this "circular," which, in common with all things connected with the war, is on a grand scale. It is in quarto, 161 pages, and consists of a series of reports from medical officers on the materials and their extent and nature, available for the preparation of a medical and surgical history of the war, and drawn up under the supervision and direction of Surgeon J. J. Woodward of the Surgeon General's Office. The mass of materials appears to be very large, and the records, in connection with the immense museum of pathological specimens, are of great value, the result of a systematic course of collection and preservation that has been going on since July, 1862, previous to which time but little attention was given to the subject. It is to be presumed that the proposed history will include a full account

of the pharmaceutical department of the operations of the War Office, a subject not touched upon in this circular except where it alludes to medical wagons, medical knapsacks and chests and other arrangements for holding and conveying medical supplies on the field. We hope the department will include a full history of the Medical Purveying operations, Laboratories, Storekeeping, Hospital Stewards and the pharmaceutical service in local Hospitals in their work, if it should go on, and do full justice to the numerous body of young men who were in this service with little emolument during the war, and we shall be much pleased to receive, as occasion offers, any publications bearing on this subject that may be issued by the Department.

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*Transactions of the Pennsylvania Horticultural Society for the year 1865.* Philadelphia, 1866, pp. 96 octavo.

This interesting pamphlet, for which we are indebted to Mr. James, contains the address of D. Rodney King, President of the Society, and the transactions during the year. The latter part of the volume consists of essays contributed by members on various subjects connected with Horticulture. Among them we notice the following: On Pear Culture, by Robert Cornelius, of Philadelphia; On the Odors of Flowers, by A. W. Harrison; A glance at the Flora of the Carboniferous period, by Dr. Horatio C. Wood, Jr.; On Ferns and Mosses, by Thomas P. James, Professor of Botany to the Society; and, finally, an interesting report on the Curculio, by Prof. S. S. Rathvon, of Lancaster. The plan of publishing reports and essays is a good one, and should be continued and extended. We hope to avail ourselves of extracts from its pages in a future number.

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*Books and New Medical Journals received:—*

*Biographical sketches of distinguished living New York Surgeons.* By Samuel W. Francis, A. M., M. D., Fellow of the New York Academy. Reprinted from the Philadelphia Med. and Surg. Reporter. New York, published by John Bradshaw, 1866, pp. 220 12mo.

*The Detroit Review of Medicine and Pharmacy*, edited by Geo. P. Andrew, M.D., Samuel P. Duffield, Ph. D., and Edward W. Jenks, M. D. Vol. i. No. 1. April, 1866.

*The Savannah Journal of Medicine*, edited by Uriah Harriss, M.D., J. B. Read, M. D., J. G. Thomas, M. D. Vol. v. Nos. 1 and 2. Bi-monthly, commencing Jan. 1, 1866.

*The Medical Reporter, a semi-monthly Record of Medicine and Surgery*, edited by W. B. Alleyne, M. D., and O. F. Potter, M. D. St. Louis, March 15, 1866, vol. i. Nos. 2 and 3.

*The Medical Record, a semi-monthly Journal of Medicine and Surgery.* New York, March 15, 1866, vol. i. Nos. 1 and 2, pp. 24; edited by George F. Shrady, M. D.

*The New York Lancet*, a family Medical Journal, vol. i. No. 5, March 15.

THE  
AMERICAN JOURNAL OF PHARMACY.

JULY, 1866.

LOCAL ANÆSTHESIA FROM THE COLD OF RAPID EVAPORATION AND SPRAY-PRODUCING INSTRUMENTS, FOR THE "PULVERIZATION OF FLUIDS."

BY THE EDITOR.

The medical journals of recent date have contained several notices of the production of local anæsthesia for surgical and other purposes, where the avoidance of pain was desirable. According to Dr. Page, (Boston Med. and Surg. Journal, May 24, 1866), the possible use of cold for the production of local anæsthesia was first announced by Dr. James Arnott, of England, in November, 1847, after which Mr. Nunnally, Prof. Simpson and M. Velpeau, of Paris, (in 1850), had employed it. In the United States, Dr. J. Mason Warren appears to have applied it in removing a nævus at the Massachusetts General Hospital, in June, 1852, and subsequently by other surgeons. The difficulty in employing cold, in a practical manner, so as to continue and regulate it, rendered this method ineligible in many cases.

In 1862, Dr. B. W. Richardson, of London, was attracted to Dr. Arnott's use of cold, and he commenced experimenting with the view of getting a practical means of producing local anæsthesia. As early as 1858, M. Girons exhibited before the Academy of Medicine at Paris, an instrument for atomizing fluids, by means of which the escape of compressed air forced a fine stream of medicated fluid against an oblique metal plate or tube, so as to convert the fluid into fine spray. After this Dr. Bergson, of Berlin, suggested the little instrument known as the Bergson

tube, and which has been so extensively applied as a parlor curiosity for perfuming the atmosphere. This consists of two glass tubes with capillary extremities, so connected together that one is vertical and the other horizontal, their orifices being so arranged in position that a current of air blown through the horizontal tube passes across the extremity of the vertical tube, and causes an upward current by suction. If now the inferior end of the vertical tube be placed in a vial containing an odorous fluid, and a strong current of air be blown through the horizontal tube, the air is drawn out of the former, which causes the fluid to rise to the orifice and, under the influence of the current of air, to be converted into an exceedingly fine spray or mist, which readily mingles with the air and odorizes it. Various other forms of apparatus, involving the principal of the Bergson tube, have been suggested, among which is that of Dr. Siegle, in which a current of steam, at a regulated temperature and pressure, takes the place of air; and that of Dr. Andrew Clark, of London, who uses a gum-elastic tube, attached to the horizontal tube of Bergson's apparatus, and containing two hollow gum-elastic balls, one of which acts as a reservoir for air, and is surrounded by netting to prevent its expansion beyond a certain degree; the other ball is constructed like the ordinary gum syringe ball, with two valves, so that simple compression and release will force a current of air into the upper ball, from which it gradually escapes with a force proportioned to the condensation of the air. By means of these instruments a current of spray or "pulverized fluid" may be directed against any part of the body requiring this form of medication, with the greatest ease, especially to the eyes, ears, gums, etc. It has long been well known that rapid evaporation produces a reduction of temperature, and the cold produced by the action of the Bergson tube was soon observed. Dr. Richardson, in searching for a means of applying cold, saw the applicability of this principle to his purposes, and devised the following arrangement, whereby ether and other volatile fluids may be rapidly vaporized and directed to any desirable point. It consists of a graduated bottle for holding the ether; in the mouth of this, and passing through a good cork, is a double glass tube, so arranged that the inner

and smaller tube shall reach the bottom of the bottle and upwards nearly to the mouth of the outer tube. The latter is pierced horizontally, just above the cork, by a smaller tube, by means of which it is attached to a hand bellows by a gum tube. The outer tube is also perforated by a small hole communicating with the interior of the bottle. When a current of air is forced horizontally into the larger tube it impinges against the opposite side, compressing the air in the bottle, and thus forcing the ether to rise in the small inner tube, whilst the main body of the air takes a vertical direction and escapes above with great force, carrying with it the ether, which is thus very rapidly, vaporized, producing extreme cold. By altering the size of the opening of the inner tube by movable jets, and by having two apertures for the entrance of air, and two pairs of bellows, the operator can continue the proportion of ether and air, and can readily produce a cold of six degrees below the zero of Fahrenheit. Dr. Richardson remarks, (*Med. Times and Gaz.*, Feb. 3, 1866): "By this simple apparatus, at any temperature of the day and at any season, the surgeon has thus in his hands a means for producing cold even six degrees below zero; and by directing the spray upon a half-inch test-tube, containing water, he can produce a column of ice in two minutes at most. Further, by this modification of Siegle's (Bergson's) apparatus, he can distribute fluids in the form of spray into any of the cavities of the body—into the bladder, for instance, by means of a spray catheter, or into the uterus by an uterine spray catheter."

"When the ether spray thus produced is directed upon the outer skin, the skin is rendered insensible within a minute; but the effects do not end here. So soon as the skin is divided the ether begins to exert on the nervous filaments the double action of cold and of etherization; so that the narcotism can be extended deeply to any desired extent. Pure rectified ether used in this manner is entirely negative; it causes no irritation, and may be applied to a deep wound, as I shall show, without any danger. I have applied it to the mucous membrane of my own eye, after first chilling the ball with the lid closed."

Dr. Richardson's paper then details several surgical cases wherein his method had been successfully employed, (See Amer.

Jour. Med. Sci., April, 1866, page 513), and continues: "These results are so interesting that I make no apology for bringing them at once before my medical brethren. I wish it to be distinctly understood, that at the present moment I only introduce the method here described for the production of superficial local anæsthesia. It is, I believe, applicable to a large number of minor operations, for which the more dangerous agent, chloroform, is now commonly employed—I mean such operations as tooth extraction, tying nævus, tying piles, incising carbuncles, opening abscesses, putting in sutures, removing small tumors, removing the toe nail, dividing tendons, operating for fistula, removing cancer of the lip and other similar minor operations."

Dr. Richardson expresses the opinion that much more may be expected from this mode of producing anæsthesia, and thinks that even a limb might be amputated if some fluid of negative qualities and low boiling point can be obtained from the hydrocarbon series, (a suggestion which appears to have been realized, so far as the fluid is concerned, in the so-called rhigolene, of Dr. Bigelow, See page 363 of this number.) He also entertains the hope that a way will be discovered to join the agency of bodies like morphia, atropia, &c., with ether in this method so as to narcotize the parts. "Reaction from anæsthesia is in no degree painful, and hemorrhage is almost entirely controlled during the anæsthesia."

Dr. Calvin H. Page, in the paper before quoted, speaks of an atomizer of his own invention, which differs from the instrument of Dr. Richardson, the tubes being horizontal and parallel for about three inches, but not concentric; and he esteems it well adapted to operating in the mouth. The points of the tubes approach each other at right angles, and the fluid-bearing tube bends at right angles and descends into the bottle of ether or other fluid used. With ether it produced a cold of  $-4^{\circ}$  and with rhigolene  $-16^{\circ}$  in one minute. Dr. Page believes the latter fluid to be better adapted for operations of the mouth than ether. He had used it with success in certain minor surgical operations. The greatest difficulty attending its use is the fact of its boiling below the ordinary temperature in summer, and its great inflammability. The reader is referred to an article on spray-producing

instruments, figured and described by the editor of the "Medical Record," N. Y., for June 1st, 1866.

It is not impossible that the atomizer, as a means of refrigeration, may be advantageously applied in some pharmaceutical and chemical operations on a small scale, where it is desirable to have a low temperature for a short time; for instance, in making suppositories, where a difficulty occurs in separating them from the moulds, a few moments' action of a Bergson's tube with ether or rhigolene, would cause the necessary shrinkage; or in testing oils by reduced temperature.

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### AUBERGIER'S SYRUP OF LACTUCARIUM.

BY WILLIAM PROCTER, JR.

Previous to the introduction of Syrup of Lactucarium into the Pharmacopœia, Aubergier's preparation was that chiefly used in Philadelphia, and perhaps elsewhere in the United States. The officinal syrup is so very different from Aubergier's, that it has continued in use since the publication of the Pharmacopœia, and apothecaries are not always satisfied which preparation is intended by prescribers. The literal translation of the formula for Aubergier's syrup is not adapted to ordinary usage, and it has been deemed useful to modify the manipulation so as to reach the same end.

Take of Lactucarium, (German), half an ounce,

Sugar, granulated, an ounce,

Simple syrup, four and a-half pints,

Citric acid, in powder, sixty grains,

Orange flower water, four fluidounces,

Alcohol,

Water, each a sufficient quantity.

Triturate the lactucarium with the sugar until it is reduced to powder, put it in a funnel prepared for percolation, pour on diluted alcohol until the lactucarium is nearly exhausted, or until ten fluidounces of percolate has passed, evaporate to two fluidounces, and add it to the syrup, previously heated to boiling, and mix; continue the ebullition slowly until the whole measures four pints and six fluidounces. Then add the citric acid and

strain, and lastly, when nearly cool, the orange-flower water, and mix them.

Each fluidounce contains the strength of three and a-third grains of lactucarium. Thus made the syrup is light brown in color and transparent. The clarification by albumen, recommended by Aubergier, is not always necessary, though sometimes it has been required. The use of sugar for dividing the lactucarium, and the subsequent concentration of the tincture in contact with sugar, aids in retaining those ingredients in solution, which usually separate as the syrup cools, and make it cloudy in the Pharmacopœia preparation.

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## ON FLAVORING EXTRACTS.

BY THE EDITOR.

A correspondent having requested us to re-publish our article on this subject, to be found at page 215, vol. 28th, of this Journal, (1856,) we take advantage of the occasion to modify and extend it somewhat, as well because that volume is now out of print, as because some improvements have occurred since that time.

### EXTRACT OF LEMON.

Take of the Exterior rind of lemons, two ounces.

Alcohol 95°, (deodorized,) two pints.

Recent oil of lemons, three fluidounces.

Expose the rind to the air until partially dried, then bruise it in a wedgewood mortar, and add it to the alcohol, with agitation, until the color is extracted; then add the oil, and, if it does not immediately dissolve and become clear, let it stand, with occasional agitation, for a day or two and filter.

The color for this extract may be obtained from safflower, but, for many reasons, it is better to use the natural lemon color. The object of exposing the rind is to avoid weakening the alcohol, which should be as pure as possible. When the materials used are the best, and the extract is well corked in a full bottle, it improves by standing a few weeks before filtering.



## EXTRACT OF ORANGE.

Take of the Exterior rind of fresh oranges, two ounces.

Alcohol, 95°, a pint.

Recent oil of orange, two fluidounces.

Proceed as in the recipe for Extract of Lemons.

It is much more difficult to obtain oil of orange in a fit state for making this extract than that of lemons; and none should be used that is not perfectly free from the terebinthinate odor developed by exposure and age. In purchasing the oil for this purpose, it should be put into small bottles nearly full, closely sealed and kept in a dark place.

## EXTRACT OF BITTER ALMONDS.

Take of Oil of bitter almonds, two fluidrachms.

Alcohol (95°), a pint.

Tincture of turmeric or safflower, half a fluidrachm or q. s.

Mix them. The directions accompanying this preparation should state that it is poisonous in quality.

It is not unusual, in England, to deprive the oil of bitter almonds, to be used for flavoring, of its hydrocyanic acid, before diluting it. As some may prefer to do this, to secure their preparation from the danger always incident to selling so potent a poison as the oil of bitter almonds for culinary purposes, even as a solution, we offer the following process for removing the poison.

Take of Oil of bitter almonds, two ounces.

Sulphate of iron, (U. S. P.), an ounce.

Lime, recently burnt, half an ounce.

Water, a sufficient quantity.

Dissolve the iron salt in half a pint of water, slake the lime with a half a pint of the same fluid, and mix them. Shake this thoroughly with the oil in a bottle, then distil in a glass retort or small tin still, with a good refrigeratory, until the purified oil of bitter almonds has all distilled over, which is known by the distilled water ceasing to be milky and odorous. The heavy oil, after allowing time for its separation and subsidence, is removed for use.

## EXTRACT OF ROSE.

Take of Oil of rose, half a fluidrachm.

Hundred-leaved roses, an ounce.

Deodorized alcohol, a pint.

Bruise the rose leaves, extract them by maceration in the alcohol, followed by expression, so as to get a pint, in which dissolve the oil, and filter. In the absence of the recent rose leaves, dried red rose leaves may be used, or this ingredient may be omitted, adding a minute quantity of tincture of cochineal, to give a pale rose tint.

## EXTRACT OF CINNAMON.

Take of Oil of cinnamon, two fluidrachms.

Ceylon cinnamon in powder, half an ounce.

Deodorized alcohol and water, of each, a pint.

Dissolve the oil in the alcohol, and gradually add the water, and then the cinnamon, and agitate occasionally for several hours, lastly, filter the liquid through the dregs on a paper filter, so that it may be transparent. This preparation is much improved by using oil of Ceylon cinnamon, but, where the oil of cassia is employed, the cinnamon powder partially corrects its flavor.

## EXTRACT OF NUTMEGS (OR MACE).

Take of Oil of nutmegs of good quality, two fluidrachms.

Mace, in coarse powder, an ounce.

Deodorized alcohol, two pints.

Mix the oil and powdered mace together, add them to the alcohol, and, after several hours' maceration, filter the liquid through the dregs on a paper filter.

The extracts of CLOVES and of ALLSPICE may be made by this formula, using the respective oils and powders, being careful to select materials in good condition.

## EXTRACT OF GINGER.

Take of Jamaica ginger, in fine powder, four ounces.

Alcohol, deodorized, a sufficient quantity.

Simple syrup, half a pint.

Pack the ginger, moistened with a little alcohol, in a funnel

and percolator, and pour on alcohol until a pint and a half of tincture has passed; to this add the syrup and mix. If properly prepared, no precipitation occurs.

#### EXTRACT OF BLACK PEPPER—EXTRACT OF CAPSICUM.

These are made from powdered pepper and capsicum in the manner directed for ginger, except that the sugar be omitted, and a sufficiency of alcohol used to make the measure of two pints.

#### EXTRACT OF CELERY.

This extract, like the two preceding it, is employed as a condiment for meat sauces, rather than pastry. In France, the leaves and fruit, or seed, so called, are distilled to get a volatile oil called *Huile d'ache*, and the extract used there is probably an alcoholic solution of the oil of celery. The extract of celery used in this country is made from the seeds by percolating them with concentrated alcohol. The following recipe affords a good preparation:—

Take of Celery seeds, (*Apium graveolens*,) two ounces.

Deodorized alcohol, (95 per cent.)

Water, each a sufficient quantity.

Bruise the seeds finely, pack them in a small percolator, and gradually pour on a pint of alcohol; then add water, until first a pint of tincture and then a pint of infusion have passed; mix these, triturate with a drachm of carbonate of magnesia, and filter through paper. As thus made, extract of celery has a light brown color, an agreeable odor, and a well-marked taste of celery.

#### EXTRACT OF SOUP HERBS.

Take of Thyme, sweet marjoram, sweet basil, summer savory, each an ounce.

Celery seed, a drachm.

Bruise them together until reduced to powder, and percolate with sufficient diluted alcohol to make a pint of extract. The menstruum should be made with deodorized alcohol. Some prefer to add grated lemon peel, half an ounce, and either a little onion or garlic.

## EXTRACT OF CORIANDER.

Take of Coriander, in powder, four ounces.

Oil of Coriander, a fluidrachm.

Alcohol, (95°,) a pint and a half.

Water, half a pint.

Mix the alcohol and water, then add the coriander, previously mixed with the oil, and macerate for twenty-four hours, with occasional agitation, finally decant the liquid from the dregs, put these in a percolator, and pour on the decanted liquid; when this disappears, add sufficient diluted alcohol to make the percolate measure two pints.

## EXTRACT OF VANILLA.

Take of Vanilla of good quality, an ounce.

Coarse granular sugar, two ounces.

Simple syrup, a pint.

Diluted alcohol, a sufficient quantity.

Cut the vanilla transversely in small sections, and triturate it with the sugar until reduced to coarse powder, put this in a glass funnel prepared for percolation, and pour on diluted alcohol until a pint of tincture has passed; add this to the syrup, and mix them.

## GLEANINGS FROM THE FRENCH JOURNALS.

BY THE EDITOR.

*Ozone as the cause of the decomposition of Iodide of Potassium Ointment.*—M. Dannecy, of Bordeaux, referring to the frequency with which this ointment becomes discolored, and the irregularity of its occurrence when a series of experiments were made, has arrived at the conclusion that it is a phenomenon due to ozone in the atmosphere, and that it occurs most readily at those periods when the electric condition of the atmosphere favors the production of ozone. The author had occasion to prepare this ointment for the same person many times during several months, and found, in ten repetitions, three or four times it was perfectly white the next day, whilst in the other cases, the color varied from pale yellow to deep yellowish brown—he being convinced

that it was due neither to the grease, the iodide, the water nor to the manipulation. Since arriving at this conclusion he has had it confirmed to his own satisfaction.—*Repert. de Pharm.*, Mai., 1866.

*New facts relating to fixed Oils.* By M. J. Nicklés.—There exists in the commerce of southern France, an oil called *oil of apricots*, which resembles the *oil of sweet almonds* in appearance and many of its properties, but is cheaper, and is used for adulterating the latter oil. The author was called upon to assay a sample of oil of sweet almonds suspected of this adulteration. He found that oil of apricots was susceptible to the action of hydrated lime in powder, forming with it an emulsion, which slowly takes an unctious consistence; on the contrary, oil of almonds is not emulsionized in this case; by repose the calcareous powder separates little by little and leaves the oil clear.

But when a certain quantity of oil of apricots is present, it emulsionizes by agitation, and on standing, the unctious compound of oil of apricots and lime is deposited, and may be separated by filtration. This unctious matter, which is neither an oil nor a soap, is fusible in the water bath, and becomes a limpid liquid, which concretes on cooling; but less dense than water, it floats on boiling water unchanged, except in consistence. It is soluble in hot oil, but on cooling it separates as a white cloudiness, more or less dense, which can be removed by filtration. This unctious compound may be freed from any excess of lime by filtering hot, and is soluble in bisulphuret of carbon. The following is the author's process for applying the test.

Take 185 grains of the suspected oil of almonds, and agitate it with about 23 grains of hydrate of lime, then heat it at a temperature below 212° F., filter hot in a heated funnel. By cooling the filtrate by ice water, the oil loses its transparence if oil of apricots was present. The author finds olive oil and oil of colza behave like oil of almonds; whilst the oils of hemp seed, poppy seed, groundnuts, walnuts and flaxseed produce more or less of this unctious matter in the presence of hydrate of lime; cotton seed oil gives but very little; castor oil forms a thick coagulum almost like resin.

The author believes this process may be utilized in regard to

the three non-coagulable oils above stated.—*Journ. de Pharm.*, Mai., 1866.

*New means of discovering Iodine in Liquids.*—M. Laronde suggests the use of petroleum oil for this purpose; ten grammes of the liquid to be assayed is put in a test tube with one gramme of the oil and agitated; drop in a few drops of nitric acid, and then two drops of liquid chloride of lime and again agitate. The oil soon rises to the surface with all the iodine in solution, with a more or less rose water.—*Journ. de Pharmacie*.

*Soluble Citrate of Magnesia Crystallized.* By M. Morelli, of Lille.—I have recently noticed in the *Repertoire de Pharmacie*, a process for obtaining crystallized citrate of magnesia. It is about two years that I have been in the habit of preparing it for use in my shop by a different method. My method, because of its easy execution, it appears to me, will be of use to my confreres, which is the reason I make it known through your excellent Journal.

Take of Citric acid, in powder,	1400 parts.
Sub-carbonate of magnesia,	660 “
Water,	550 “

These substances, mixed intimately in an earthen vessel, form a liquid paste which swells up by the reaction between the acid and carbonate. It is necessary to stir the mass from time to time with a wooden spatula. After an hour or two the disengagement of carbonic acid ceases and the materials are slowly transformed into a crystalline mass analogous to moist sugar. It is finished by drying in the air. This salt being in microscopic crystals dissolves very rapidly in four times its weight of water; it is the bi-metallic citrate of M. Perret. The proportion of sub-carbonate is two-thirds of that necessary to saturate the acid. It is necessary to use an acid and carbonate of great purity.

Although this salt has a very acid taste, an agreeable solution can be obtained by the following recipe :

Take of Crystallized citrate of magnesia,	694 grains.
Bi-carbonate of soda,	77 “
Syrup,	770 “
Water sufficient for half a bottle.	

—*Repert. de Pharm.*, Mai, 1866.

*Researches on the Volatile and fixed oil of the fruit of Samphire (Crithmum maritimum).* By M. Hérourard.—The samphire is an umbelliferous plant growing abundantly on the rocky coasts of France and England. All parts of the plant are aromatic and it is used as an ingredient in flavoring pickles, etc. The most favorable time for the extraction of the volatile oil is from the 10th of September to the 15th of October, and the fruits yield 1.5 to 1.6 per cent of the oil.

The oil of samphire (*criste marine*) is composed of a light and a heavy oil, the latter separating from the milky distilled water on standing, the former, which is the aromatic oil of the plant, floating on top. This is limpid and mobile when recent, has a sweet odor and hot aromatic taste. It boils at about 350° Fahr. Its sp. gravity is 980° at 55° F. It is oxidized by the air, becomes thick and heavier than water; when recent, it remains fluid at 49° Fahr., but the old oils deposits silky needles when cooled. Further investigation found this body to be a result of oxidation, and to be an acid, and the oil itself to yield, by the action of weak nitric acid, a *hyduret* of a compound radical parallel with benzyl, which he calls *crithmyle*, and which forms combinations with chlorine, bromine and iodine. The acid by oxidation is *crithmic acid*.

*Hyduret of Crithmyle* is an oily brown liquid of sp. gr. 1.07, has an aromatic odor of the plant; its taste acrid and burning, affecting the throat strongly; it is insoluble in water but readily soluble in alcohol and ether, and burns with a sooty flame.

*Crithmic Acid* presents the form of colorless brilliant prismatic needles which resemble those of benzoic acid, a taste lightly acid, no odor, volatile without decomposition. Slightly soluble in cold water, more soluble in hot water, and readily in alcohol and ether and in the oil of samphire, from which it is derived.

*The fixed oil* of the fruit is siccative of an orange yellow color, and oxidizes readily in the air to a brown soft solid.—*Jour. de Pharm*, Mai, 1866, 324.

*Orange leaf water as an adulteration of orange flower water.*—M. Gobley, (*Jour. de Pharm.*, Avril, 1866, 249,) says that water distilled from orange leaves is sometimes substituted for or

mixed with orange flower water, than which it is much less odorant or agreeable. He proposes the following chemical means of distinguishing between these two waters. Twenty parts of nitric acid, 10 of sulphuric acid, and thirty of water are mixed. The assay is made by mixing one part of this test acid solution with five parts of the distilled water of orange flowers, when a rose color of greater or less depth, according to the strength of the water, occurs. With the water of the leaves no such coloration occurs. Unfortunately this test is only useful in distinguishing the separate waters, as it will not detect the presence of the leaf water even negatively, as flower orange flower water is made of several commercial strengths. It is also the opinion of M. Rabot, that age deprives this water of the property of being colored by the acid mixture. [We have tried this test with orange flower water, imported in flasks, and find it to react perfectly; but water made from oil of neroli did not react, so that this test will distinguish the distilled orange flower water from that made from oil of neroli.—ED. AM. JOUR. PHARM.]

*Sericographis Mohitli and its coloring matter.*—M. Thomas, Pharmacien attached to the French Expedition to Mexico, found in the valley of Orizaba, a plant called *Mohitli* by the Indians, much used by them in dysentery. They macerate the fresh leaves of this plant in water during several hours, which produces a beautiful violet blue-colored infusion, which is taken as a medicine the next day, fasting. The plant belongs to the natural order Acanthaceæ, and described by Nees Von Esanbeck under the name *Sericographis Mohitli*. The natives call it *yerba azul* (blue herb.) The aqueous extract of the plant has a deep blue color, is very hygroscopic and in great part re-dissolves in water. The solution again filtered and evaporated affords the coloring matter in a purer state, deep blue, amorphous and inodorous. Its solution acts with acids and alkalies like litmus. If the herb is acted on by water in a close vessel out of contact with air, the blue color is not developed, but the infusion, by simple agitation with air in a bottle partly filled, takes the blue tint. Protochloride of tin decolorizes the liquid and causes a deep green precipitate. The author calls the colorless natural principle *mohitleine*, the green color produced by the action of air on this



*mohitleine*, and that the blue color is due to the formation of *mohitlic acid* which, combined with alkaline bases of the salts contained in the water, yields the blue color. The latter statement needs corroboration.—*Jour. de Pharm.*, Avril, 1866.

*Erythrocentaurin*.—M. C. Méhu describes (*Jour. de Pharmacie*, Avril, 1866, p. 265,) this principle as existing in *Erythraea centaurium* as neutral, colorless, inodorous and tasteless. It fuses at  $277^{\circ}$  F., is not volatile, and crystallizes on cooling. At a higher temperature it is consumed without residue. It is soluble in 1630 parts of cold and 35 parts of boiling water, and in 48 parts of ordinary alcohol at  $60^{\circ}$  F., in 13 parts of chloroform and in 245 parts of strong ether. Fixed and volatile oils, benzine, and sulphuret of carbon, dissolves it readily, and much more hot than cold. It is remarkably indifferent to acids and alkalies.  $\text{SO}_3$  dissolves it in quantity, without being colored, and the addition of water precipitates it in crystals. Neither nitric, muriatic nor chromic acids have any action upon it, nor have the mineral alkalies. Chlorine, bromine and iodine are without action on it at the ordinary temperature, but chlorine at its fusing point changes it. Oxide of silver, tannin, creasote, bisulphite of soda, acetate of lead, chlorides of platinum, mercury and iron do not. It, however, acts on permanganate of potassa in the cold. Its composition is, Carbon 67.66, Hydrogen 5.09, Oxygen 27.25 per cent, which corresponds with the formula  $\text{C}_{27}\text{H}_{12}\text{O}_8$ .

The most remarkable property of erythrocentaurin is that of being rapidly colored rose color by the solar rays, the coloration being rapid in proportion to the intensity of the light. This remarkable phenomenon is purely physical; it occurs whether the crystals be in air hydrogen, sulphuretted hydrogen, bicarburetted hydrogen, carbonic oxide or carbonic or sulphurous acids. After coloration it is not altered in weight, and on solution in any of its solvents becomes again colorless. It also becomes colorless at  $270^{\circ}$  F., and then is susceptible to the same action of light. The author has studied the influence of light on this substance very elaborately, and results of great interest have been developed. He finds only the most refrangible rays of the spectrum are active in modifying erythrocentaurin, and that analogous

effects may be produced by the agency of the light from colored glass, and by colored solutions of metallic salts in which the substances, are placed in sealed glass tubes. Though these blue and violet colored solutions act as the same colored glass in permitting the solar actinic rays to pass them, yet he finds many exceptions; for instance, a blue ammoniacal nitrate of copper allows these rays to pass, whilst equally blue ammoniacal nitrate of nickel does not permit any of them to pass. Sulphate of quinia and esculin completely arrest these rays, but we must refer our readers to the original paper above noted. The author has studied *santonin* in its relation to light and finds it in many respects like erythrocentaurin—but in others differs decidedly.

W. P., Jr.

## NOTE ON BATTLE'S SEDATIVE SOLUTION OF OPIUM.

BY THE EDITOR.

We have been repeatedly applied to for a formula for Battle's solution of opium, under the impression, by the querists, that an authentic copy of the recipe had been published. Physicians in Philadelphia, and probably other parts of the United States, prescribe it as though it were an officinal preparation. Yet it is parallel with McMunn's Elixir, and should be classed with secret preparations, if the latter be. Various recipes have been published for the preparation, some of them alleged to be genuine. The general impression among English writers of its composition is, that it is an aqueous solution of dry extract of opium, with about one-fourth of its bulk of alcohol added to render it permanent. Mr. Cooley, in his *Cyclopædia of Practical Receipts*, gives half a dozen versions of the recipe. The one which he appears to consider as nearly authentic is as follows:—

*Liquor Opii Sedativus.*

Take of hard aqueous extracts of opium, three ounces,  
 Rectified spirits, six fluidounces,  
 Water, a sufficient quantity.

Boil the extract in thirty fluidounces of water till dissolved; when cold filter, add the alcohol and sufficient water to make forty fluidounces *Imperial measure*.

As crude opium yields from a-half to eleven-twentieths its weight of officinal extract to cold water, his recipe makes the preparation somewhat stronger than laudanum, whilst Prof. Redwood, in his "Supplement to the Pharmacopœia," remarks, "The strength of the liquor is about equal to that of laudanum, and is given in nearly equal doses."

Mr. Wilkinson (Pharm. Jour. vol. xii. page 253) assayed the genuine liquor opii sedativus, and arrived at the conclusion that it was intended to be of the strength of the laudanum of the London Pharmacopœia. Hence I believe we may fairly assume, from the evidence, that its strength corresponds with that of laudanum. Battley's sedative solution is imported at a price which places it beyond the reach of many for whom opium is prescribed, retailing at one dollar per fluidounce. This is a sufficient reason why the preparation, if it has merit, should be made here, and by a regular and recognized formula. Now, if physicians who desire to use this preparation would employ the "deodorized tincture of opium" of the Pharmacopœia, they will find all the merit which Battley's solution can have, in a greater degree, assuming it to be made by the formula above noted or an analogous one. It is pretty well understood that the substance or substances which render laudanum offensive to many persons, consist of the odorous rank matter and probably resinous matter. By using cold water much of these principles is avoided, especially if the watery solution is evaporated to dryness and the extract re-dissolved, which rejects more. For the same reason old dry opium pills, and roasted opium are less offensive to some patients than opium in its recent state. In Dr. Squibb's Liquor Opii Compositus the same method of getting rid of the odorous matter is resorted to, including the evaporation and ethereal treatment, with the addition of some Hoffman's Anodyne as a corrective. In view of all the evidence, we believe that deodorized tincture of opium fully represents Battley's solution in strength and in acceptability to the stomach; and that the apothecary is justified in preparing Battley's solution by the formula above given.

## THE PREPARATION OF SULPHOCYANIDE OF POTASSIUM.

BY JAMES F. BABCOCK, Boston.

The usual process for the preparation of this salt, as given by Fresenius, is as follows :

“ Mix together 46 parts anhydrous ferrocyanide of potassium, 17 parts of carbonate of potassa, and 32 parts of sulphur; introduce the mixture into an iron pan provided with a lid, and fuse over a gentle fire. Maintain the same temperature until the swelling of the mass which ensues at first has completely subsided, and given place to a state of tranquil and clear fusion; increase the temperature now towards the end of the operation, to faint redness, in order to decompose the hyposulphite of potassa which has been formed in the process. Remove the half-refrigerated and still soft mass from the pan, crush it, and boil repeatedly with alcohol of from 80 to 90 per cent.

“ Upon cooling, part of the sulphocyanide of potassium will separate in colorless crystals; to obtain the remainder, distil the alcohol from the mother liquor.”—*Fresenius' Qual. Analysis*, 6th ed. p. 57.

Those who have attempted this process may have been disappointed in not obtaining so large an amount of sulphocyanide as they were led to expect. The process is, when best conducted, far from economical.

The management of the heat is difficult, as well as the exclusion of the air; and the subsequent boiling “*repeatedly with alcohol of from 80 to 90 per cent.*” is of course expensive.

Moreover, the slimy mass left after the solution has been made retards, and in some cases almost totally prevents the filtration of the liquid, while it has been the writer's experience to find it extremely difficult by this process to get rid entirely of the sulphide of potassium formed, the presence of which unfits the sulphocyanide for the ordinary uses to which it is applied. Repeated failures by this and other methods in use, as the “bi-sulphide of carbon and ammonia process,” (*London Pharm. Journ.*, Vol. VII. No. 4,) which is certainly disagreeable, and not entirely free from the objections mentioned above; and the want of a process really economical led to experiments, the re-

sult of which is the following method, which has been found uniformly to give good results, a large yield, and to require far less alcohol than any other process known to the writer.

The saving in alcohol, where the quantity prepared is large, is of course of considerable importance.

The process is as follows :

Take of cyanide of potassium, in small pieces of about the size of a pea, two parts by weight ; sulphur one part.

Mix thoroughly, and fuse gently in an iron pan over a Bunsen's burner, until the cyanide is entirely fused and mixed with the melted sulphur, and the blue flame of sulphur, and the scintillation caused by the burning of minute particles of iron, have ceased ; and allow the whole to cool, until a drop let fall into water no longer produces a hissing sound.

Then pour the still soft mass into three parts of water, in which it immediately dissolves ; filter, to separate impurities, particles of sulphuret of iron, etc. The filtrate contains a large amount of sulphocyanide of potassium, mixed with sulphide, hyposulphite, cyanate, etc. ; the next step is for the removal of these.

This is simply and perfectly attained by the addition, with constant stirring, of dilute sulphuric acid (1 to 4), until the reaction is slightly acid. This operation should be performed under a hood, or in some place where the gases evolved may be removed.

Sulphocyanide of potassium is neutral to test paper, and not affected by dilute sulphuric acid in the cold, while all the other substances mentioned above are at once decomposed, evolving sulphuretted hydrogen and cyanogen compounds, and depositing a considerable amount of sulphur.

The liquid is filtered to separate this, and then contains only sulphocyanide of potassium and sulphate of potassa ; the quantity of the latter depends upon the purity of the cyanide of potassium employed, since any carbonate present forms direct sulphur compounds, which are afterwards decomposed by the sulphuric acid added. Where the amount of sulphate formed is large, it may partially separate with the sulphur, as a dirty, white, crystalline powder.

The filtered liquid is evaporated to one-third its bulk, and allowed to cool, to deposit a quantity of sulphate of potassa. It is then mixed with its own volume of alcohol of about 90 per cent., which causes the precipitation of almost the whole of the sulphate of potassa (*Anthon, J. Pr. Ch.*, Vol. 14, p. 25).

The solution after filtration may be evaporated to dryness, and yields a product containing only a trace of sulphate of potassa, and of sufficient purity without further crystallization, for any of the purposes for which it is required,—whether as a reagent, (*iron test*), the precipitation of sulphocyanide of mercury for “Pharaoh’s Serpents,” or the preparation of the ammonium salt for photography. Subsequent crystallization from alcohol yields the salt perfectly pure.

The commercial cyanide of potassium, being very impure from carbonate and cyanate of potassa, is not so well adapted for use in this process as that known as “granular cyanide;” the increased price of the latter being more than compensated by the larger yield and improved quality of the product. Good commercial cyanide gives, however, very good results.

The heat required is not great, and the vessel should be removed from the fire as soon as possible after the formation of the sulphocyanide, as it rapidly decomposes at a temperature of fusion, in contact with the air. This process gives equally satisfactory results, whether small or large quantities are operated upon, and has been perfectly successful in the hands of the writer in the preparation of quantities varying from two ounces to twenty-five pounds. The amount of sulphocyanide obtained is, with good cyanide of potassium, about equal to the weight of the latter employed.

Boston, June 23, 1866.

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#### SMALL-POX REMEDY.

Editor Am. Jour. Pharm. *Dear Sir:*

The 47th number of Braithwaite’s Retrospect for July, 1863, gives so favorable an account of the virtues of the *Sarracenia purpurea*, or American Pitcher-plant, in the cure of the small-pox and measles, that I was induced to procure a quantity of it

from the Botanic Garden of Mr. Gates, at Mt. Lebanon, N. Y., of course *in a dried state*, and *consisting only of stem, leaves, and flowers, but no roots*; and this I distributed among my medical friends, requesting they would report to me the effects of the medicine, if any, that I might compare them with my own experience. But I never received but one answer, which agreed with my own judgment, that the medicine did no harm, but was not as highly beneficial as the printed description gave us reason to expect.

I took no further trouble about it. But the *Memphis Daily Avalanche* of 10th inst. prints a copy of a letter to the editor of the *Evening Mail*, of London, England, that is so important that I send you a copy of it for publication; and remain

Yours, most respectfully,

JOHN MILLINGTON, M. D.

“SIR,—Some time ago seeing a paper written by Assistant Surgeon Miles, of the Royal Artillery, on the efficacy of the North American plant *Sarracenia purpurea*, or pitcher plant, in the treatment of small-pox among the Indians, my colleague Mr. Agnis and myself have given this remedy, which has been imported into this country by Dr. Miles, a fair trial; and I am happy to say the eleven cases in our hands have recovered under its peculiar influence.

“This remedy I consider a boon to the public, for this reason: it is so easily managed, any person can make a decoction or infusion of the root, like tea. One ounce of the *root* is sliced and infused in a quart of water, and allowed to simmer down to a pint, and given in two table-spoonful doses every four hours, while the patient is well nourished with beef tea and arrow-root. Four of the cases in my hospital have been severely confluent, the pustules thickly running into each other. They have throughout the disease all been perfectly sensible and free from pain, and have not felt weak. I have carefully watched the effects of the medicine, which seemed to arrest the development of the pustules, killing, as it were, the virus from within, and thereby changing the character of the disease; and doing away with the cause of pitting without opening the pustules. In my opinion all anticipation of disfigurement may now be calmed,

provided the medicine is given from the commencement of the disease. Before leaving this subject, I may here caution the public that the efficacious part of the plant is the *root*. With the usual kindness of Dr. Gibson, the Director General, I have been amply supplied with it for the use of my regiment; and I hope to hear of it in every family medicine chest, and that it may be generally cultivated in every garden. And before long then we shall see no more faces—as described by Dickens—like the interior surface of sliced pumpkins.

“I am most respectfully yours,

COSMO G. LOGIE,

Surg. Maj. Royal Horse Guards, Windsor, Eng.”

25th May, 1863.

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#### ADVICE UPON EPIDEMIC CHOLERA.

BY EDWARD R. SQUIBB, M. D., Brooklyn, N. Y.

In view of a probable invasion of Epidemic Cholera, it is considered useful to try to attract early attention to the following circumstances, and to offer the advice which naturally results from their due consideration, to the end that the knowledge and experience gained in the medical profession through previous epidemics of the disease may be more generally known.

In previous epidemics many lives were lost, and much sickness occurred;—first, through want of early attention;—next, through the use of quack nostrums and specifics, which are generally hurtful, and are made and advertised to make money by; and lastly, through the want of simple information among the people as to the recognition of, and some uniform system of management for, the painless curable stages of the disease.

Cholera usually begins by a simple diarrhœa, which is too apt to escape notice, particularly in thoughtless persons and in children. If it can be seen by physicians in this early stage, a large proportion of the cases can be cured; and the earlier it is seen by physicians, the better it is for the patients, and the easier for the physicians.

In time of Cholera every movement of the bowels after the customary daily one, must be considered as a tendency towards



the disease; and a second unnatural movement establishes a diarrhœa, and should never be disregarded.

Parents, therefore, should watch their children closely at such times;—and all persons should pay strict attention to themselves, for this, the most curable stage of the whole disease, is often of short duration, and in it the disease is easily stopped in a large majority of cases.

The danger is in proportion to the frequency and copiousness of the discharges from the bowels; and vomiting and cramps, though often easily checked by the early attention of a physician, are always to be regarded as warnings of great danger.

The early diarrhœa is generally easily checked by very simple means. Often simply lying still in bed will check it. And all who have it should go to bed,—not so much because they are sick, as to insure them against getting sick. When quietly at rest in bed many very simple remedies will arrest a diarrhœa which would otherwise go on in spite of everything. When not in bed, the more quiet the better under all circumstances:—but to run about in the hot sun, or get excited, or irritated, or frightened, is very bad.

A diarrhœa, no matter how slight, cannot be considered cured until the discharges have entirely resumed their natural appearance and infrequency for two days, and even then it will recur from slighter causes than at first, and be more obstinate after each relapse.

No matter how mild or slight the diarrhœa may be, the physician should be informed of it if he be at hand, or can be easily reached. But if he be not at hand, time should not be lost in waiting for him; and with prompt and proper attention he may then not be needed at all. A simple mild diarrhœa is easily arrested by rest, diet, and a small dose of laudanum, with or without spirits of camphor taken after every discharge from the bowels; and such doses can always be had in a very few minutes from every apothecary's shop. But the experience of many epidemics has shown that a judicious combination of three or four medicines, all of which have been long used in various proportions, and about which there is no secrecy or complication,—is better adapted to the generality of such cases than any one or two of them; while such a combination is adapted to later stages and

more severe cases of the disease, to which laudanum and camphor alone would not so well apply.

Such a judicious combination, compiled from the recorded knowledge on the subject, it is believed will be found in the following mixture, which all good apothecaries can make and keep ready for use. And the public generally is strongly advised to adopt and rely upon this as being better and more safe than the advertised specifics and nostrums of the day; and as being all that the present state of knowledge will afford, and all that common sense and reason can expect from any remedy not adjusted to each special case, as remedies always should be if possible.

Apothecaries are also strongly advised to adopt this formula, name, and label,—to prepare the mixture carefully from good materials, and to sell it with the label and directions here given;—and to sell no other preparations, for these uses except upon the written prescription of a physician. The label and directions here given in full detail, are adapted to a four-ounce vial, and the apothecary only has to have them copied by his own label-printer, with his business card appended at the bottom.

*Compound Tincture of Opium or Diarrhœa Mixture.*

This Mixture is composed of Tincture of Opium, Spirit of Camphor, and Tincture of Capsicum, each one fluid ounce, Purified Chloroform, three fluidrachms, and a sufficient quantity of Stronger Alcohol to make the whole measure five fluidounces.

Each fluidrachm, or teaspoonful, contains about 100 drops, consisting of 12 minims of each of the first three ingredients and  $4\frac{1}{2}$  minims, or 18 drops of Chloroform.

DOSE: For persons over 18 years of age, a teaspoonful.

"	"	14 to 18	"	"	a small teaspoonful.
"	"	10 to 14	"	"	half a teaspoonful.
"	"	6 to 10	"	"	thirty drops.
"	"	2 to 6	"	"	ten to thirty drops.

For infants one to ten drops, according to age.

In time of Epidemic Cholera or Diarrhœa, when any person has two movements of the bowels more than natural within the 24 hours, the second one should be followed by a dose of this Mixture; the dose to be repeated after every movement that follows. If the movements increase in frequency or in copiousness after the second dose of the medicine has been taken, a physician should be sent for at once, and a double dose be taken after each movement until he arrives. Immediately after taking the first dose, the person should go to bed, and remain there for 12 hours after the diarrhœa has entirely ceased.

Appended to this paper, but by no means secondary to it in importance, is the excellent address to the public, published by the Metropolitan Board of Health, of New York. It is reprinted here, to increase, if possible, its dissemination.

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#### METROPOLITAN BOARD OF HEALTH—ADDRESS TO THE PUBLIC.

The Board of Health publish this simple statement, and beg the public to give to it their earnest attention.

Cholera is generally a preventable disease, and in its early stages can be arrested if the habits be good. Study therefore temperance in eating and drinking. Do not believe that alcoholic stimulants are useful in guarding you against an attack. Let the food be nutritious, and keep the digestive organs in a healthful condition. Use no stale or uncooked vegetables. Let your meat be fresh and your vegetables be well cooked, and all fruits be fresh and ripe.

Cleanliness of the body is of the first consideration. Keep the skin in a healthy state by bathing the whole body, with a free use of soap. Cold bathing is best used in the morning—never just before going to bed. Dry frictions or the warm bath may be more safely used just before going to bed.

Cleanliness in your homes is of equal importance. Let your apartments be dry—never damp. Suffer no decayed vegetables or stagnant water to remain in your cellars or yards. Any disagreeable smell from privies, cesspools or sinks, is a proof of their unhealthfulness. Remove them by necessary repairs, lime, chloride of lime, or whitewashing. Ventilate well your houses and apartments. Expose your bedding to the air and sun. Avoid excessive fatigue. Keep regular hours in eating and sleeping. Wear flannel next to the skin. A good plan is, if the bowels are at all disordered, to wear a broad band of flannel (a flannel belly-band) around the body, reaching from the hips to the ribs. Maintain the natural temperature of the body by sufficient clothing; especially keep the feet warm. Never when heated sit on the grass or stone seats, or sleep under an open window. If exposed to wet, change your boots and clothes as soon as possible.

Take no purgative medicines, except by direction of a physician.

Cholera is almost invariably preceded by a painless diarrhœa, and this is in all cases to be promptly treated.

When diarrhœa is present, go to bed and maintain a position on the back, use abundance of blankets, and send for a physician.

A physician can always be obtained by applying at the nearest police station.

Stay in bed until you are well. Do not consider yourself well until you have had a natural movement from the bowels. Abstain from all drinks. Apply mustard plasters to the bowels.

In the absence of a physician the adult can take ten drops of laudanum and ten drops of spirits of camphor. A child of ten years may take five drops of laudanum and five of camphor. A child of five years may take three drops of laudanum and three of spirits of camphor; and these drops may be repeated every twenty minutes so long as diarrhœa or pain or vomiting continues. This will save time, *but in all cases send for a physician.*

*Do not get up to pass the evacuations,* but use the bed-pan or other conveniences.

*Never chill the surface of the body by getting out of bed.*

Remove immediately all the evacuations from your rooms; scald all the utensils used, or disinfect them with chloride of lime; scald also your soiled clothing.

## NITRO-GLYCERINE.

By ENNO SANDER, Ph. D., St. Louis.

The nitro-glycerine, which has lately attracted the public attention by such terrific explosions, is formed when glycerine is gradually added at low temperature to a cooled mixture of nitric and sulphuric acids. It is supposed that the nitric acid  $3\text{NO}_5$  splits into  $3\text{NO}_4$  and  $\text{O}_3$ , which latter combine with  $3\text{H}$  from the glycerine  $= \text{C}_6 \text{H}_8 \text{O}_6$  to  $3\text{HO}$ , while the  $3\text{NO}_4$  take the place of  $3\text{H}$  in the glycerine and produce the compound nitro-glycerine  $= \text{C}_6 \text{H}_5 3(\text{N O}_4)\text{O}_6$ . The pure nitro-glycerine is a heavy, oily liquid of nearly 1.60 specific gravity; clear, slightly straw colored; explodes by concussion, not by being ignited; ceases

to burn when the light is removed, and decomposes with explosion at a temperature of 350° F. Under the name of glonoin, it had been used in medicine; the inhalation of its fumes cured violent headache, and its action on the animal system is, according to Dr. Demme, of Bern, similar to strychnia; its employment would be indicated in those cases where *nux vomica* is used, the effects of which it seemed to excel in some instances.

It may be from the fact that never large quantities at a time have been prepared and preserved, or that the chemists have operated with pure materials only, no accident from explosion or otherwise has been recorded;\* to the contrary, it has not been considered dangerous except when taken internally.

I am unable to state whether nitro-glycerine has been applied technically, otherwise than as Nobel's Blasting Oil (Spreng-Oel) which Mr. Nobel claims to be almost pure, at least as much so as an article of that kind permits to be without becoming too expensive. This patent blasting oil is an oily liquid of a light gray color of the same specific gravity as the other, and also insoluble in water. It claims in fact the same properties as the pure glonoin and the same relations to test. Mr. Nobel, in reply to a statement of spontaneous decomposition of nitro-glycerine, denies it positively that his compound, even if spontaneously decomposed, could ignite and explode, for it *only explodes at a temperature of 350° F.*, and it is very doubtful that any liquid should acquire such a temperature by slow organic decomposition. He also states that a bottle of oil, for twelve years in his possession, has been treated in boiling water many a time, exposed to the action of the sun and various chemical substances without showing the slightest trace of decomposition. He attributes the decomposition of the oil alluded to solely to impurities contained in it.

A communication to a scientific society at Berlin, in speaking of the blasting oil, considers its "harmlessness" on being transported or stored—a great advantage over gunpowder, which it also exceeds more than twenty times in explosive power. The

[\* This is an error, (see Amer. Jour. Pharm., 1860, page 524,) as Dr. Chas. Ferris nearly lost his sight by the explosion of this substance by heat.—ED. AM. J. PHARM.]

regular explosion in blasting is caused by a patent fuse and patent cap.

I have tried to give you a condensed report of all the information concerning this compound which I could obtain from the periodicals I have access to. It is entirely insufficient as regards the explanation of the three terrible explosions at New York, Aspinwall and San Francisco, for even thus far we cannot find anything which would permit us even to guess at the causes of the spontaneous combustion. We must expect, however, that chemists will now feel an interest in the matter, and study this compound in regard to its decompositions, and find out the means of avoiding the repetition of such unfortunate catastrophes.—*Medical Reporter*, St. Louis, May 15, 1866.

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#### EXPLOSION OF NITRO-GLYCERINE.

The terribly explosive properties of this dangerous substance have been illustrated by a painful coincidence of events in San Francisco and Aspinwall, by which many lives and much property have been destroyed. It is strange that similar accidents have not previously occurred in the mining districts of the Pacific coast. Nitro-glycerine, or glonoine, as it is sometimes called in medicine, is prepared by allowing glycerine to fall drop by drop into a mixture of equal parts of nitric acid and oil of vitrol, care being taken to prevent the temperature from rising too high. A heavy, oily-looking liquid collects at the bottom of the vessel, which has a sweetish aromatic taste, and is a dangerous poison. A single drop placed upon the tongue produces a severe pain in the head for hours. Its formula is  $C_6H_6 2(NO_4)O_6$ , or for two equivalents of hydrogen in the glycerine two of peroxide of nitrogen are substituted. A drop placed upon paper and struck on an anvil produces a powerful concussion. Under circumstances little understood the friction of its particles among themselves even when frozen, or contact with some foreign substance, is sufficient to produce such effects as those below given. Its manufacture or storage in some parts of Europe is forbidden, and the Mayor of New York has acted wisely in causing the removal of all found in that city.

The following facts are from the *Panama Star and Herald*:

“ Nearly, if not all the local freight of the European had been delivered, when about 7 o'clock in the morning of the 3d, a terrific explosion occurred on board, which tore away the upper parts of the ship and blew several large plates off the side. The wharf at which the ship was unloading, and which was some four hundred feet long, was literally torn to pieces; the superstructure was completely demolished to within a hundred feet of the freight house, and hardly a plank remained in the entire length of the structure that was not wrenched from its fastenings.

“ Immediately in front of where the vessel lay a gap was cut through the wharf, piles, planking, etc., all disappearing. The ship and wharf both caught fire, and the latter was saved from entire destruction only by the exertions of several citizens, who got the fire engine to work, and after a few hours extinguished the flames, regardless of the risk they incurred from another explosion of the burning ship. The Panama Railroad Company's splendid freight house is left a pile of ruins. The force of air caused by the concussion seems to have raised the roof—which was constructed of iron and slate—upwards a few feet, its own weight bringing it down with immense force into the building, and carrying with it both the end walls, leaving the house, excepting the side walls, which appear but little if at all injured, a mass of ruins.

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“ The most awful part of the catastrophe was the dreadful loss of life and suffering attending it. Of the number killed and missing it is impossible to give a correct estimate; but from present data the number may be safely put down at fifty, and is, we fear, more likely to prove over this number than under it. Of the forty-one men comprising the crew of the European, nine have been killed and twelve are missing.

“ The scene in Aspinwall after the first explosion cannot be described—it was harrowing in the extreme. Whilst the ruins gave an air of desolation to the place, the mangled and lacerated bodies or pieces of bodies, to be met with in every direction for a great distance around the ruin of the disaster, were heart-rending, and the suffering of the poor mortals crushed and bruised, in whom life was not extinct, was really dreadful.

“ The amount of damage caused by the explosion is roughly

estimated at \$1,000,000, which is about the lowest figure at which it can be placed."—*Boston Med. and Surg. Journal*.

*Another Explosion at San Francisco.*—As we go to press, news arrives of another fearful explosion, supposed to be of nitro-glycerine, on April 16. The number of persons killed and the amount of damage done appears to have been greater than in any previous casualty of the kind. We may here state that a bill to regulate the storage and transport of nitro-glycerine will be introduced into the House of Commons immediately. It is intended to put nitro-glycerine under the same restrictions as fulminating mercury and similar compounds.—*Chem. News*, June 1, 1866.

*Rendering Nitro-Glycerine Non-Explosive.*—It appears that practically there is no greater difficulty in rendering nitro-glycerine non-explosive and explosive at pleasure than there is in accomplishing the same feat with gunpowder, although the means employed are, of course, dissimilar. The recent accidents with the new explosive agents have induced Mr. Nobel to turn his attention seriously to the subject, and he is now enabled to state that by mixing the nitro-glycerine with methylic alcohol (a cheap spirit, popularly known as spirit of wood) the nitro-glycerine is rendered unexplosive, either by percussion or heat. When required for use water is added, which absorbs the spirit, and the oil sinks to the bottom of the vessel, whence it is drawn by a syphon, and its explosive nature thereupon found to be restored. Experiments for testing the value of this discovery have already been made in America, and given highly satisfactory results. We look upon the subject as one of the greatest importance to miners, and shall be glad if the new discovery enables us to transport nitro-glycerine, at least as safely as blasting-powder, while we believe it has already been proved much more efficacious.—*Chem. News*, June 8, 1866, from *Mining Journal*.

#### NOTE ON THE TENACITY OF LIFE OF THE SEEDS AND SPORES OF SOME PLANTS.

By PROF. WILLIAM H. BREWER.

Edwards and Colin (*Annales des Sci. Nat.*, [2], Bot. I, 257) made experiments on the power of resisting elevated or de-



pressed temperature possessed by the seeds of various leguminous and cereal plants. They found that all lost their vitality if heated in water at  $167^{\circ}$  F., which is the temperature at which starch grains burst. The most of the seeds had their vitality destroyed when heated in water below this, but would stand a temperature of  $122^{\circ}$ ; while in steam they would stand  $144^{\circ}$  F.; and in *dry* air some germinated after being heated a very short time to  $167^{\circ}$  F. Above this all lost their vitality. Some would stand a dry cold of  $70^{\circ}$  F. below zero.

Berkley states (Introduct. to Cryptogam. Bot. p. 68) that he has "recorded an instance of the germination of thousands of grape seeds after three emersions in boiling water; and Dr. Lindley mentions the fact of raspberry seeds growing after being boiled for jam, in which case, if the sugar were really boiling, the temperature would be above the boiling point of water." The author considers, however, that the observations were not sufficiently exact in either case.

Balfour states (Class Book of Botany, p. 628) "the seeds of *Phytolacca decandra* and of the Raspberry have been known to germinate after exposure for a short time to the heat of boiling syrup," but does not give his authority.

Hemmingway states (Ann. of Nat. Hist., [1], viii, 317) that the seeds of *Sambucus nigra* germinated after being twice boiled in making wine, being present during the vinous fermentation, and remaining twenty months in the dregs of the cask.

In regard to the spores of Fungi, Berkley remarks (Outlines of British Fungology, 32) "that the spores of certain Fungi would bear a moist heat equal to that of boiling water without losing their power of germination. They have also considerable powers of resisting frost, but the exact limits in either case under varying circumstances have not at present been ascertained."

More to the point are the experiments of the eminent cryptogamic botanist, Payen, on the red mould in the interior of bread, which created such a stir in Paris nearly twenty years ago. This mould, the *Oridium aurantiacum*, was developed in the interior of the bread within an incredibly short space of time after it had been baked, especially in the Barrack-bread, ("pain de munition,") at Paris. He found (Ann. de Chem. et

de Phys., [3], xxiv, 253) that pieces of bread, and also of dough, upon which the spores of this fungus had been sown, and then exposed in tubes in moist air for half an hour to the respective temperatures of 212°, 221°, and 248° F., afterwards produced the red fungus; while similar pieces of bread and dough, treated in a similar manner but not sown with the spores, did not yield this specific fungus. When the spores were heated in tubes to 284° F. they lost their red color, and then ceased to germinate.

It seems that in this case, as in that of the cereals, the vitality of the seeds or spores is retained under certain circumstances up to nearly or quite the temperature required to decompose the chemical substances in the seed, or to disorganize the structure. In the still lower Cryptogams we have no data either as to the chemical character of their spores, the temperatures required to change their organic compounds, or to disorganize their structure, and none whatever as to the temperatures they may withstand and still germinate. It seems, therefore, unsafe to assume, without proof to the contrary, that their vitality (germinating power) is destroyed at a temperature much below that required for their actual destruction or disorganization.

One of the most remarkable examples of tenacity of life in the higher plants is presented by the *Lewisia rediviva* of Western North America, a large-flowering fleshy plant, of the Portulacæ, growing in British Columbia, Oregon and California. Dried specimens that have been two years or more in an herbarium will still grow, and are often troublesome from sprouting while between the papers. One specimen, collected by Dr. Lyall, of the British Navy, was "immersed in boiling water" to stop this growing propensity before drying out; and yet, more than a year and a half afterward, it showed symptoms of vitality, and in May of 1863 it produced its beautiful flowers in the Royal Gardens of Kew. This plant in flower is figured in Curtis's Botanical Magazine for August of that year. It is very desirable that some special experiments should be made to ascertain just how much boiling it may undergo without loss of vitality.

April 6th, 1866.

—*Silliman's Journ.*, May, 1866.

## OIL OF ANISEED AS A DEODORIZER OF TERSULPHIDE OF POTASSIUM.

BY W. S. W. RUSCHENBERGER, U. S. Navy.

A wish to use a solution of sulphuret of potassa as a lotion to a lady's skin led me to seek means to overcome or neutralize the odor of the preparation. Among other substances, I tested to a limited extent the deodorizing properties of the permanganate of potassa. For the purpose, I prepared a solution of the salt, from the manufactory of Mr. Morson, London, in the proportion of two parts to one thousand of distilled water by weight.

This solution was added to peppermint-water, to camphor-water, to a ten-grain solution of tersulphide of potassium, and to spirits of turpentine, in the proportion of about one part to two. There was no perceptible change of odor in either case, even after exposure to the air during twenty-four hours. The beautiful magenta color of the permanganate solution was wholly discharged in the mint-water, with a flocculent, light brown precipitate; in the turpentine, with a dark brown precipitate; and in the sulphuret solution, without precipitate. In the camphor-water the color remained unchanged, but there was a very slight brown precipitate after standing twenty-four hours.

To the mint-water, camphor-water and solution of tersulphide of potassium the solution of permanganate was added in excess. After exposure to the air during twenty-four hours, the characteristic odor of each article still adhered to it.

Recollecting that when I was engaged in anatomical studies, many years ago, I removed the cadaveric odor from my hands by washing them with camphorated tincture of opium, more expeditiously than by any other material then known to me: I added to a solution of tersulphide of potassium (sulphuret of potassa,) ten grains to a fluidounce of distilled water, twenty drops of *opii tinctura camphorata*. A very feeble but totally different odor remained; its offensiveness had disappeared, and the lotion was used without provoking any remark about its smell.

Which one of the constituents of the paregoric is the deodoriz-

ing agent? A solution of benzoic acid added to a solution of the tersulphide caused a white precipitate; the tersulphide was decomposed, and the offensive odor was intensified.

About a fluidrachm of anise water (prepared after the manner of preparing camphor-water) was added to an ounce of the ten-grain solution of the tersulphide of potassium, and the odor instantly changed its character, and was no longer offensive. A like effect followed the addition of a single drop of the oil of anise to two ounces of the same solution. No perceptible chemical change occurred in the solution.

A single drop of oil of anise was rubbed with a drachm of lard, and then five grains of tersulphide of potassium in fine powder were thoroughly mixed with it, to form an ointment which was without offensive odor.

The oil of anise employed in these experiments was more than two years old.

Is the phenomenon just mentioned due in any manner to the quality possessed by the vapor of the oil of aniseed to intercept radiant heat? Professor Tyndall, in his recent work, "Heat considered as a Mode of Motion," (New York edition, p. 374,) states that, regarding dry air at the tension of one atmosphere as unity, the absorbent power of the vapor of the oil of aniseed in intercepting radiant heat is represented at 372, which is greater than that of any other essential oil mentioned by him in this connection.

Whether this is to be regarded as an instance of catalysis, and the presence of the oil simply arrests the evolution of hyposulphuric acid, is a question to be determined. Chemists may or may not regard these suggestions worthy of consideration. I cannot attempt to account for the phenomenon.

Navy Yard, Boston, Mass., April 2, 1864.

—*Amer. Jour. Med. Sci.* Oct., 1864.

## POISONING BY EATING THE FRUIT OF THE RHUS TOXICODENDRON:

BY J. W. MOORMAN, of Hardinsburg, Ky.

The poisonous effects of the *Rhus Toxicodendron* are well known. (See *Griffiths Medical Botany*, p. 184; *U. S. Dispensa-*

tory, 12th ed., p. 836, &c.) Nevertheless, but few cases, we believe, have been recorded of poisoning resulting from eating the fruit of the plant, and it therefore may be well to record two cases of this kind communicated to me by a professional friend.

The subjects of these cases were children, one six and the other eight years of age. The quantity eaten was nearly a pint. In a few hours the children became drowsy and stupid, and in a short time vomiting commenced, first of the partially digested fruit, afterwards of a thick, tenacious fluid of a wine color. Then convulsions of different parts of the body followed, accompanied by slight delirium. Respiration was hurried, pulse at first full and strong, but slow, afterwards, small, frequent and compressible; pupils dilated. Warm water was given to promote emesis, and thus clear the stomach of the poisonous matter; afterwards large quantities of carbonate of soda in solution, under the belief that it was an antidote to the poison. Otherwise they were treated on general principles. Both cases recovered, though the youngest convalesced very slowly.—*Am. Jour. Med. Sci.*, April, 1866.

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#### REMEDY FOR EPILEPSY.

By GEORGE C. CLOSE.

A few months since, a copy of a recipe—said to be a remedy for epilepsy, and which had been put up by a New York firm, somewhat celebrated for their specialities—was handed to me, with a request to state my price for compounding it. I did so, and returned it to the person who handed it to me. Soon after, I received from two independent sources copies of what I know to be essentially, and believe to be precisely, the same recipe, with the intimation that it was of French origin.

The reason I now call the attention of the Association to this matter is, that I am informed that the firm mentioned above, and whom, for the sake of a name, I will call Jones, Smith & Co., are now advertising this article as their remedy for epilepsy.

I therefore wish to make the recipe public, so that when Jones, Smith & Co.'s remedy for epilepsy is inquired for, members may

tell their customers, if they choose, that the recipe has been published, and is not the property of the pretended owners. This I think will have a tendency, as it were, to "cut the corners" of quackery, which I believe is a legitimate object of this Association.

I have put up this recipe a large number of times, and am informed by one of my customers that it has proved an effectual remedy in his case.

It is as follows:—

R.

Potassii bromidi,	. . . . .	5vi.
Ammonii bromidi,	. . . . .	℥ii.
Potassæ bicarb.,	. . . . .	gr. xv.
Aquæ,	. . . . .	℥iii.
Tinct. Columbæ,	. . . . .	℥iss.

℞.

Dose, a teaspoonful three times a day.

—*Proc. Amer. Pharm. Assoc.*, 1865.

## ON THE PHARMACOPŒIA STRENGTH OF BRANDY AND WHISKEY.

BY DR. W. H. PILE.

In examining recently some California brandy, of Perkins, Sterns & Co., said to be a very pure article, I found its alcoholic strength to be but 44 per cent. by volume by a standard Tralles' instrument. This would be equivalent to twelve degrees below proof. Our national Pharmacopœia gives the strength both of brandy and whiskey as ranging between 48 and 56 per cent. of absolute alcohol.

At first sight the above-mentioned brandy would appear to be but 4 per cent. below the inferior limit of strength. The question here arises, does the Pharmacopœia mean in its definition a percentage reckoned by volume or by weight? This is an important point to be established. As the Pharmacopœia is presumed to be complete in itself, the preliminary remarks were looked over to settle this query. Unfortunately, nothing is there found relating to this subject, and we are left to our own interpretation.

In the New Dispensatory, by Wood and Bache, 11th ed., under the head of Brandy we read that "it contains on an average 53 per cent., by measure, of alcohol of the density .825." Now, as alcohol of this specific gravity contains but  $92\frac{1}{2}$  per cent. of pure alcohol, it follows that this brandy, containing but 53 per cent. of  $92\frac{1}{2}$  per cent., or 49 per cent., nearly, by volume, is within the limits of the definition given as brandy in the Pharmacopœia, provided percentage by volume is meant.

On the other hand, upon looking at the remarks under the head of whiskey, we find this paragraph: "It should contain from 48 to 56 per cent. alcohol, and its specific gravity, *therefore*, should not exceed .922 at 60° F., nor be less than .904." Now, an alcoholic liquor of these specific gravities will be found, by referring to the table of Tralles, to have a per cent. by volume of from  $55\frac{1}{2}$  to 64. This is much greater than the strength of brandy as found above. How is this discrepancy to be avoided? Who shall decide when doctors disagree?

It is unfortunate that the term percentage of alcohol was not determined to mean per cent. by volume, that measure being universally adopted in all commercial transactions, and also by the Revenue Department of our own and other countries. At any rate, the omission to state definitely what the Pharmacopœia intends by the term percentage of alcohol, must render the definitions of brandy and whiskey uncertain in regard to their strength.—*Proc. Amer. Pharm. Assoc.*, 1865.

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#### ON THE USE OF GLYCERIN TO PREVENT THE DEPOSITION OF APOTHEME.

BY A. B. TAYLOR.

"In what preparations may Glycerin be used to prevent the deposition of apotheme? What is the minimum quantity that will answer the purpose, and will such preparations bear dilution?"

The following remarks are offered in reply to the above query, which was accepted by me at the last meeting of the Association.

The only preparations, perhaps, in which Glycerin could be used for the purpose specified, are Fluid Extracts, Decoctions, Infusions and Tinctures, and accordingly experiments were instituted with specimens of each of these classes.

*Fluid Extract of Cinchona.*—This extract, prepared according to the formula given in my essay on the subject last year, appears to be in every respect satisfactory. I would not recommend any reduction in the quantity of Glycerin there ordered, although a trifling reduction might, perhaps, be made without injury to the preparation. Upon being diluted with water it is rendered turbid, but the infusion thus made extemporaneously becomes clear again, upon the addition of a small quantity of diluted sulphuric acid, or of elixir vitriol.

*Fluid Extract of Catechu.*

*Fluid Extract of Kino.*

*Fluid Extract of Krameria.*

The formulas given for these preparations, by Prof. Procter, in his paper on Fluid Extracts, published in the volume of Proceedings for 1863, are satisfactory, and the quantity of Glycerin as small as would be advisable.

The first two are miscible with water in any proportion without precipitation; the Fluid Extract of Krameria is slightly precipitated on the addition of water.

*Fluid Extract of Rhubarb.*—Not being entirely satisfied with this preparation, when made according to the U. S. Pharmacopœia, I was induced to prepare some after the following formula, in accordance with a suggestion offered in my essay, read last year.

Take of Rhubarb in moderately fine powder 16 troy-ounces.

Glycerin 8 fluidounces.

Alcohol 24 fluidounces.

Diluted alcohol a sufficient quantity.

Moisten the Rhubarb with four fluidounces of the alcohol, introduce it into a conical glass percolator, press it gently, and pour upon it gradually twelve fluidounces of alcohol. When the liquid has disappeared from the surface, gradually pour on, first a mixture of eight fluidounces each of Glycerin and Alcohol, and afterwards diluted Alcohol, until three pints of liquid have been obtained. Set aside the first pint obtained, in a warm place, until reduced by spontaneous evaporation to six fluidounces. Evaporate the remainder of the liquid by a gentle heat to ten



fluidounces, mix with the reserved portion, and strain, if necessary, through a muslin strainer.

The resulting extract, of which a specimen is herewith submitted, is of a deep reddish-brown color, entirely clear and transparent, in thin layers, and having in perfection the flavor of the root.

It is much thinner than the officinal extract, and, as is believed, will be found to be a more satisfactory preparation. A precipitate is formed by the addition of water; the extract is, however, soluble in all proportions in syrup, so that an elegant syrup may be prepared from it extemporaneously by the simple addition of syrup, and the syrup thus made of the officinal strength is miscible with water without precipitation. A sample is herewith presented.

*Decoction of Yellow Cinchona.*—For the purpose of comparison, two decoctions were prepared, one according to the U. S. Pharmacopœia, the other in the same manner, excepting the addition of a fluidounce of Glycerin in making a pint. The two decoctions were very similar in appearance; that containing the Glycerin having a rather darker color. No difference in the strength of the two could be discovered by the taste, the bitterness of one being somewhat disguised by the Glycerin. After standing for two days, both of the decoctions remained equally turbid; an ounce of the one containing Glycerin remained slightly turbid after the addition of two fluidrachms of Glycerin, but become perfectly clear upon the addition of a third fluidrachm.

The conclusion arrived at from these experiments was, that the addition of Glycerin to the decoction would not be advisable, for although a greater amount of extractive matter might be obtained from a given amount of the bark, still the same end (that is, increased strength) might be arrived at more simply and economically by using a larger quantity of the cinchona bark.

*Infusion of Yellow Cinchona.*—Two cold infusions, of half a pint each, were prepared, one with water, the other with water to which half an ounce of Glycerin had been added. (The aromatic sulphuric acid being left out in both cases.) The results and conclusions arrived at were substantially the same as in the preceding experiment with the decoctions.

*Tincture of Cinchona.**Compound Tincture of Cinchona.*

These tinctures were prepared according to the U. S. Pharmacopœia, with the exception that a fluidounce of Glycerin was substituted for a fluidounce of water in each pint of the menstruum used.

The resulting preparations did not differ in appearance or sensible properties from the officinal tinctures, and up to this time, now some three months, have not shown any disposition to precipitate cinchonic red, remaining perfectly clear and bright. This experiment is not decisive, but I am inclined to believe that the addition of this quantity of Glycerin to these tinctures is beneficial.—*Proc. Amer. Pharm. Assoc.*, 1865.

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## LOUISIANA ROCK SALT.

The New Orleans *Times* of a recent date has the following interesting account of the wonderful deposits of salt on Petite Anse Island:—

Perhaps the purest and most important natural deposit of salt in the world is that found on our coast, at Petite Anse Island. This deposit was referred to in French's "Historical Recollections of Louisiana." He quotes from the papers left by an English voyager who visited the Mississippi, or, as it was then spelt, *Mechacebe*, in 1698—99.

Strange as it may appear, all knowledge of this salt mine was lost among our people till after the commencement of the recent war. At that time the residents of the interior, who were unable to procure a supply of salt otherwise, resorted thither for the purpose of boiling down the briny waters which gurgled from the base of the island elevation. This, after some investigations and experiments in well-boring, resulted in the discovery of the fact that a great portion of the island, with the exception of an upper layer of earth, was a complete crystal mass of salt. The island was the property of Hon. D. D. Avery, and its value in the then condition of the Southern States was regarded as incalculable. For two years, nearly the whole of the trans-Mississippi was supplied from this mine, no

less than 21,000,000 pounds being taken from it in the course of three months.

When the islands passed into the hands of the Federal forces, the works, bridges and buildings were destroyed, but the solid rock of crystal wealth remained, and is in future to form a prominent part of the material resources of Louisiana. The mine has recently been purchased by C. A. Weed, of this city, and Hawkes, Pratt & Co., of New York. Their borings have extended over a great number of acres, and the salt rock is found everywhere, from fifteen to twenty-two feet below the surface. At the point where the principal excavation was made, the pits have been sunk through the salt to the depth of over forty feet, without finding any indication of reaching the bottom. It is supposed that the mine covers at least one hundred acres, and there is at present no means of ascertaining the depths of the deposits. A number of dwelling-houses and extensive stables have already been completed on the island, and a large building is now in process of construction over the main entrance, which is to contain the steam-engine, mills, crushers, &c. In one week ten inexperienced hands recently got out 200,000 pounds of salt—nearly four tons per day to each hand. What will be the product when all the contemplated mechanical agencies are put into effective operation?

An analysis made by Dr. J. L. Riddell, of New Orleans, gives the following result:—

I find the samples of rock salt furnished by you from the Petite Anse Mines, Attakapas, La., to contain in one hundred parts by weight:

Chloride of sodium (common salt)	. . . . .	98·88
Sulphate of lime (gypsum)	. . . . .	0·76
Chloride of Magnesium	. . . . .	0·23
Chloride of Calcium	. . . . .	0·13
Total	. . . . .	<hr/> 100,00

Nothing else present in quantity to be appreciated. This salt is white or colorless, and visibly consists of impervious aggregations of irregular cubical crystals of common salt, averaging a quarter of an inch in diameter. It attracts no

moisture from the atmosphere. I am not aware of any mine of rock salt hitherto discovered of greater purity and higher intrinsic value.

J. L. RIDDELL,  
Professor of Chemistry.

*Drug. Circ., May, 1866.*

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#### SALT IN IDAHO AND NEVADA.

A correspondent of the San Francisco *Bulletin*, writing from Soda Springs, Idaho, says:—This community are at present deeply interested in the workings of the Oneida Salt Company, a corporation duly formed under the Territorial laws for the purpose of manufacturing salt, with a capital stock of \$1,000,000, divided into 1,000 shares, and pocketed by a few original locators. The Company, I understand, have commenced operations upon a large scale. The grounds of this company are situated upon the Lander Cut-off Emigrant Road, about 250 miles north from Salt Lake City, and about 60 miles north from this place. I have conversed with Messrs. Penwell & Stump, the President and Secretary, and learn that upon their land are situated a number of large springs, with a flow of about 150 inches of water, which, after a thorough test, have been found to yield one-third pure, fine table salt when boiled. The Company have erected works to produce 100,000 lbs. per month. The expense which will necessarily accrue in the manufacture of this amount will not exceed one quarter cent per pound, and for which there is a natural market in the mines of our sister Territory, Montana, with a nett profit of not less than ten cents per pound. These springs have been known for years—emigrants passing over that road having spoken of them in the highest terms, and a mere lack of energy has permitted them to be unappropriated. The consumption of salt in mining counties is very great, and the productions of the springs will supply the demand. The mineral wealth of this country is yet undeveloped, but will not be so long. Many prospectors from a distance have already found their way hither with the determination of thorough examination in the early spring. A number of mines (placers) are now being worked in and about Salt

Spring and Pleasant Valley, though their owners have sufficient presence of mind to keep their immediate whereabouts secret; but, suffice to say, the spring and summer will make a thorough exposition. There is no doubt that this country (South-eastern Idaho) will soon equal Boise and Ruby districts in mineral products.

The *Reveille* says: The subjoined notes of a trip hence to Silver Peak by Mr. Scrimgeour, will be found interesting. The distance between Austin and Silver Peak is 156 miles nearly due south. After passing through the canon on the summit, the roads are remarkably good. The descent from the summit to the great south basin is gradual up to within five miles of the point, when it increases rapidly. We estimated the basin to be about 1,000 feet below Smoky Valley. This remarkable salt basin lies ten to twelve miles west of the Peak—a prominent point in the mountain range containing a plain twenty-five miles long with an average breadth of five miles. It is surrounded on all sides by high ranges of mountain, and its margin is as smooth as any sea beach. Viewed from an elevation, it resembles a frozen lake, with its surface covered with snow, and the illusion is aided by several masses of limestone—its icebergs—rising from its surface to a height of about 200 feet. The surface of the basin has a coating of salt nearly six inches thick. A portion of the northern end is now covered with water, which, however, becomes dry in summer. Near the western shore of this lake or basin there are two large boiling hot salt springs—one of which is very active—producing an inexhaustible supply of salt in large beautiful crystals. This valuable property belongs to the mill company which had the spirit and enterprise to pioneer that section of the country.—*Drug. Circ., May, 1866.*

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## ON SOME PROPERTIES OF FORMIC ACID.

By M. F. V. JODIN.

Beer yeast and many other cellular beings belonging to the simplest types of the fungi family may be classed between the animal and vegetable. As vegetables they extract their nitrogen

from ammonia and nitric acid;\* but they cannot, as animals, assimilate carbon, unless it is offered in the state of a ternary compound.

It is now four years since I proposed fixing the limit of the synthetic power of these beings—that is to say, to find out which was the most simple ternary body which could furnish them with assimilable carbon. Experiments have shown that nearly all ternary compounds of vegetable or animal origin, sugars, tartaric, succinic, acetic, oxalic, &c., &c. acids, can each separately, by its association with ammonia, phosphoric acid, potash, &c., form mycogenic media, in which, under certain conditions, organized productions will develop, at the expense of the ternary compound. Formic acid forms the sole exception, and for that reason merits a special study, which I have but recently been able to undertake.

I first proved afresh that formic acid, free, or neutralised by an alkaline or earthy base, associated with the mineral elements  $\text{PO}_5$ ,  $\text{NH}_3$ ,  $\text{KO}$ , &c., cannot produce a mycogenic liquid. I have kept similar preparations for more than six months, without the appearance of the least organized production altering the perfect limpidity or the chemical composition of the liquid. In this respect formic acid differs from all other ternary acids, including oxalic acid, which, under these conditions, when the solutions are not too much concentrated, and their acidity sufficiently attenuated by the addition of a base, will give organized productions.

These first experiments seem to show that the molecule of formic acid was incapable of furnishing carbon assimilable to the simplest cellular organisms. I wish to find out whether this assimilation could not take place indirectly, as by attraction, associating, in the mycogenic medium, the formic molecule with one more condensed, for instance sugar.

I have, then, made some mixtures, in which the carburetted element, instead of being, as before, simply formic acid, was an association of nearly equal parts of sugar and formic acid, *combined* with lime or an alkali. Similar mixtures have been found highly mycogenic, and have given abundant results. By suffi-

\* As regards nitric acid, I am not quite decided on this point.

ciently prolonging the experiment, it will always be found that a more or less considerable portion of the formic acid will have disappeared during the vegetation. Sometimes even, it will have entirely disappeared. Is this disappearance of formic acid due to true assimilation? or to a phenomenon of extra-organic oxidation, analogous to that which takes place during the acetification of alcohol, under the influence of the formation of mother of vinegar? This is a question which my experiments have not yet been able to solve.

I have in the above italicised the word "combined," because, in fact, the mixed preparations remain perfectly sterile if they contain a very small proportion of free formic acid. I have proved that a thousandth of free formic acid is sufficient to keep solutions of sugar from altering, though very mycogenic without this addition.

This property is remarkable. I ascertained that it does not depend on a purely chemical action by establishing a comparison between perfectly similar preparations, except that the formic acid was replaced by an energetic mineral acid—hydrochloric acid—the greatest quantity being five to six thousandths. After a certain time these preparations produced mycodermis, much less rapidly, it is true, than in unacidulated solutions.

I sought another comparison in phenic acid or phenol, and found that by putting side by side mycogenic sugared preparations, to which I added in one case from one to two thousandths of formic acid, and in the other an equal proportion of phenol, the former nearly always remained unchanged.

This was not the case with fresh muscular flesh. Having placed three pieces of beef, weighing each about 30 decigrammes, in three bottles containing, the first 200 cubic centimetres of water with a thousandth of phenic acid, the second 200 cubic centimetres of water and a thousandth of formic acid, the flesh was preserved a relatively much greater time than that of the two others; that in the water acidulated by formic acid putrefied much more slowly than that in the distilled water and presented peculiar phenomena. Thus, the liquid surface was covered with a thick mycodermic layer, which was not the case with the two others. After some time the three liquids pre-

sented an alkaline reaction. This explains why the preservative action of the formic acid lasted a much shorter time than that of the phenol, since, according to the preceding observations, formic acid exercises this power only when free, while phenol, on the contrary, can exercise it as well in a slightly alkaline medium.

From the rank occupied by formic acid in the series of organic compounds, these facts seem to me to bear on the most important problems of natural philosophy. By many this acid is regarded as the first of a long series of products engendered by the reduction of  $\text{CO}_2$  in the vegetable organism, while it is really the key to the artificial synthesis so brilliantly developed by the works of M. Berthelot. For these reasons the study of its chemical and physiological functions is necessarily of great interest.—*Lond. Chem. News*, April 13, 1866, from *Comptes Rendus*, lxi., 1179.

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#### ON PHARMACEUTICAL HERBARIA.\*

BY DANIEL HANBURY.

That the well-educated pharmacist should possess a certain familiarity with the plants employed in medicine and especially with those indigenous to his own country is a proposition upon which there can scarcely be any difference of opinion. The effort of mind and habits of observation brought into requisition in order to obtain such knowledge, are in no small degree beneficial; while the agreeable reminiscences called forth by an inspection of the plants gathered in years long passed, are such as may well repay the trouble of forming and preserving an herbarium.

But it is not the formation of a general herbarium or even of an herbarium of British plants, interesting and valuable though

\*The culture of Botany by Pharmacutists in the United States is sadly neglected. Even most of the Colleges of Pharmacy do not insist on Botany as one of the sciences indispensable to the course of instruction. The ready accessibility of wild plants, many of them in our *Materia Medica*, and the great pleasure accruing to the student from their collection and study, are reasons alone sufficient to attract their attention to practical Botany; and we reprint Mr. Hanbury's remarks, intended for the English student, as appropriate here. ED. AMER. JOUR. PHARM.



they are, that I venture now to advocate. I wish rather to point out the advantage to the student of being able to consult a small collection of medicinal plants preserved in herbarium-form, and to draw attention to the ease with which such a collection may be formed. One of the regulations imposed by a paternal but despotic government on the continental apothecary is that he shall provide and maintain in good order for the use of his apprentices, an herbarium of medicinal plants. Let us draw a lesson from this. In the British Pharmacopœia about 170 plants are enumerated as furnishing the vegetable *Materia Medica* prescribed in that work; and of this number more than 50 are either indigenous to or are cultivated in Great Britain. An herbarium comprising even four-fifths of this number would be no unimportant aid to the student who was "reading up" a subject so uninviting to most as *Materia Medica*. I would not however restrict my herbarium to the plants of the pharmacopœia. There is a considerable number that are used in rustic medicine, some of which were held officinal by the London College of Physicians but a few years back. As instances of this, let me enumerate Woodsorrel, Sweet Flag, Garlic, Marsh Mallow, Asarabacca, Bistort, Bitter Cress, Lesser Centaury, Quince, Carrot, Black Hellebore, Elecampane, Lettuce, Bay, Common Mallow, Horehound, Pennyroyal, Wormwood, Buckbean, Tormentilla, and Coltsfoot. To this number may be added with advantage certain plants which are interesting to the pharmacist from their liability to be confounded with others that are officinal, as *Pyrethrum* and *Matricaria*, which may be mistaken for Chamomile, Fool's Parsley, supposed sometimes to do duty for Conium, Hawkbit and *Rhamnus Frangula*, which it is said have been passed off for Dandelion and Buckthorn.

As to exotic medicinal plants, the difficulty of obtaining specimens would, I must admit, be far greater and the pharmaceutical herbarium must inevitably contain many blanks. Still as the Pharmaceutical Society numbers over 40 members resident in foreign countries, it would not, I believe, be impossible to interest some of them in procuring and forwarding to our secretary specimens for distribution of some of the commoner

economic plants occurring in their respective districts. In this way our pharmaceutical herbariums might be enriched with such tropical plants as the Clove, Cinnamon, Allspice, Cassia Fistula, Pareira Brava, Quassia, etc.

One of the more complete herbaria of the character I have attempted to describe, ought to be preserved at Bloomsbury Square, and others in the rooms of the Branch Societies at Edinburgh, Liverpool, etc.; but in addition I would suggest to those who feel or wish to feel interested in botany, to commence themselves the formation of an herbarium of medicinal plants, taking as a nucleus those commonest plants of our gardens, fields, hedge-rows and commons, the Cherry-Laurel, Lavender, Dandelion, Bittersweet, Elder, Foxglove, etc.

It is unnecessary here to describe the simple operation of preparing botanical specimens (an operation for which a pharmacist has several facilities); but a few words may be said on the best method of mounting them so as to render them at once convenient for reference, and as little liable as possible to sustain injury from handling and from the depredation of insects. In the first place it should be a rule that no specimen should be mounted unless previously brushed over with an alcoholic solution of Corrosive Sublimate, a precaution against the ravages of a certain mischievous little beetle, extremely ready to prey on dried leaves. Specimens having been subjected to this operation, should be re-dried with slight pressure and are then ready to be fastened to the paper on which they are to be ultimately preserved. This may be done simply with short, narrow strips of paper, gummed or glued so as to hold down the stems and more prominent parts. Specimens thus fastened can be readily removed, when it is desirable to replace them by better; but for an herbarium that is to be frequently handled (and by others than its owner) it is preferable to resort to a method of attaching specimens still more secure, and this is conveniently effected by the use of common glue brushed while hot over at least a portion of the specimen. Strips of gummed paper may be conveniently used in addition for the better securing of woody stems, roots, bulbs, and such like. The paper on which specimens are mounted should be good and

stout, and in oblong pieces measuring about 17 inches by 10. The usual method of putting by mounted specimens is to place them loose in brown-paper covers, which are afterwards arranged one above another in the pigeon-holes of a cabinet. For an herbarium specially pharmaceutical, comprising as it necessarily would but a limited number of specimens, a large book, made so as to open flat, would probably be even more convenient than the ordinary loose sheets in covers. The specimens would be retained in proper sequence, and be more compact and manageable than if upon separate sheets. Some well-arranged volumes of this kind would afford much of the benefit to be derived from engraved figures:—in fact in many cases, the examination of an actual specimen is far more impressive and informing than the inspection of a plate. The authors of the *British Pharmacopœia* have carefully mentioned in what works figures may be found of the several plants enumerated in that volume. The number of works thus referred to is twenty-six; many of them are of great rarity and quite inaccessible to the majority of persons who would wish to consult them,—while to purchase the whole series a sum would be required approaching £230.

I trust I have said sufficient to show that the formation of herbaria of medicinal plants is a subject that merits some attention at the hands of the Pharmaceutical Society.—*Lond. Pharm. Jour.*, May, 1866.

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#### ON YELLOW WAX COMPARED WITH WHITE, AS A CONSTITUENT OF CERATES, &c.

BY FERRIS BRINGHURST.

Having for some time theoretically believed in the superiority of selected yellow wax over white wax, in making cerates, ointments, suppositories, &c., and having practically and thoroughly tested this theory, I am so well convinced of its correctness, as to be strongly tempted to depart from the strict letter of the *Pharmacopœia*, and use the yellow to the exclusion of the white, in all compositions, officinal and non-officinal, of which wax is a constituent.

About eight months ago I made some simple cerate, using

yellow wax, for exhibition at the last meeting of the American Pharmaceutical Association, a specimen of which is on the table, and will be found to have kept well, and in fact is as good, if not better, than the specimen of officinal cerate made about six weeks since.

I have used yellow wax for several years in making "Glycerin Cream," and have never known it to spoil, while in "Cold Cream," made with white wax, the change of age is readily detected. This difference is no doubt due in part to the preservative influence of the glycerin.

In making suppositories, I have for a long time used the yellow instead of white wax, for giving proper consistence to the cocoa butter, and find a decided advantage.

In the former case, the original chocolate odor is well preserved, while in the latter there is a rank odor, like that of stale, burnt coffee.

About two years ago, while the armies for and against the Republic were contending about Spottsylvania, I was one of a Committee sent from our city to Fredericksburg to care for the sick and wounded. Having a knowledge of medicines, I was at once assigned as Hospital Steward in the main hospital of the Second Corps, then actively engaged. Large supplies of dressing were required, and I had occasion to open and inspect many cans of simple cerate, some bearing the labels of eminent houses here, others that of the U. S. Army Laboratory; all, no doubt, made according to the officinal formula, and of selected materials; but there was scarcely any of it I considered fit to dress sores and wounds, requiring a bland cerate free from irritating qualities, as the "Ceratum Adipis" is intended to be. Let us for a moment compare the virtues of the two.

Selected yellow wax, having been subjected to but one simple manipulation, contains a trace of honey, to its advantage rather than otherwise, a peculiar balsamic principle, which gives it a delightful odor, and tends to preserve not only the wax, but all its compounds also, and a yellow coloring matter which is considered its objectionable feature.

Commercial white wax, having passed through several manipulations, nearly always contains a considerable portion of tallow,

paraffine, or other sophistication, is deprived of all its honey, and nearly, if not quite all its balsamic principles, and is so deteriorated by the bleaching process, that a slightly rancid odor is nearly always observable, and, in my judgment, it produces a strong tendency to rancidity in all its compounds. It has no particular advantage over the yellow, except in point of color, which is a very doubtful advantage, considering the sacrifice of useful features peculiar to the latter.

What does the suffering patient care for the color of an ointment, if it is adapted to his case and heals his wound? And I would ask what good and sufficient reason is there for throwing aside the peculiar virtues of yellow wax, and making a really inferior cerate, liable to constant deterioration, in order to have it white?

MR. MAISCH said that he had no practical experience with the substitution, in ointments and cerates, of yellow for white wax. Mr. Bringhurst had referred to the rancidity of all the simple cerate made by private parties, and at the U. S. A. Laboratory, which he saw on the battle field. The speaker said, however, that he had examined many samples of so-called simple cerate used by the army, and had found quite a number furnished by houses considered respectable, which did not contain a trace of wax, which was substituted by Japan wax and paraffine. This fraudulent preparation is easily recognized by its semi-transparent appearance, while true simple cerate is opaque. Japan wax is a fat, usually more or less rancid the way it appears in commerce, and must, therefore, necessarily hasten the decomposition of lard. Paraffine renders lard rancid still more rapidly. These facts account in part for the experience of Mr. Bringhurst.

Some private houses had furnished to the army true simple cerate, and all made at the U. S. Army Laboratory in this city was prepared strictly according to the Pharmacopœia. In 1863, shortly after the Laboratory went into operation, the speaker had met with some difficulty in obtaining pure lard, the commercial being found to contain a fraudulent admixture of from 12 to 16 per cent. of water. Subsequently, however, pure lard was prepared by the manufacturers for this institution. Although the material was used strictly in the proportion of the

National Pharmacopœia, still the manipulation differed somewhat from that followed by Pharmaceutists on the small scale. The material was fused by steam, then stirred until it became so thick that, on being run into cold tin cans, it would congeal in a few minutes. Made in this way, it was not quite as white as usually met with in apothecaries' stores; but a thin layer on the surface, containing more wax, and being firmer on that account, rather tended to counteract the tendency to become rancid; and he had repeatedly examined some, several months after its preparation, and, though a slight odor of incipient rancidity was observed, this decomposition had not proceeded far enough to unfit it for surgical use. From 800 to 1200 lbs. were frequently run off in one day.

MR. BRINGHURST said that he had no doubt that the simple cerate, like all other preparations made at the U. S. Army Laboratory, were prepared in accordance with the Pharmacopœia; but he had opened a great many packages issued from that institution, and found them all rancid, and, in his opinion, unfit for dressing wounds.

MR. MAISCH. Early in 1863, he had proposed to make simple cerate with yellow instead of white wax, as probably furnishing a preparation not so prone to change as the officinal; but the surgeons, who had to decide upon it, would not entertain the proposition, because the preparation would be so different in appearance from that with which the surgeons of the army were familiar, that it would be returned. There was, however, one reason which easily accounts for the rancidity of the simple cerate as met with in the general hospitals and on the battle field. Mr. Henry N. Rittenhouse, who is present at this meeting, and who has acted as Medical Purveyor during a considerable period of this war, has had practical experience in the mode of furnishing medical supplies to the army, and could give better information on this point than the speaker. Towards the close of a quarter, the Laboratory would endeavor to have a stock of all preparations on hand to fill the requisitions of the various medical purveyors, who made theirs three months in advance. The surgeons in charge of general hospitals likewise made their quarterly requisitions three months ahead, and they were usually

filled by the purveyors from the supplies received during the previous quarter. It will be seen that six to nine months might have elapsed before the medical supplies reached those points where they were to be used, and that nine to twelve months might pass away before they were all used. This is entirely too long a period to preserve simple cerate, which is rendered still more inclined to change by the heat of our summer.—*Sec. Ann. Rep. Alumni Assoc. Phil. Coll. Pharm.*

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## ON THE PRESERVATION OF MEATS BY PARAFFIN.

By PROF. REDWOOD.

Mr. John Mackay brought before the meeting a new method of preserving beef, mutton and other animal substances used for food in a perfectly fresh condition, free from salt or any other ingredient likely to interfere with the flavor or condition of the material so preserved. Mr. Mackay stated that the discovery of the process about to be submitted was due to Dr. Redwood, who, in the course of last summer, commenced a series of experiments with paraffin, in, of course, a state of purity. The following peculiarities of this substance were referred to, viz., its solidity, whiteness, tastelessness and entire freedom from smell. At a heat of about  $130^{\circ}$  it becomes fluid, and will, in this condition, bear a considerable amount of heat without boiling, and thus enables the experimenter to raise the temperature, if required, several hundred degrees above  $212^{\circ}$ , the boiling-point of water, without in any respect altering its condition. It was found that animal substances, when immersed in a bath of paraffin heated to about  $250^{\circ}$  F., rapidly lost the air and water which all such substances contain, leaving the juice of the meat in a concentrated state. Mr. Mackay explained how this was done. According to the thickness of the mass of meat, the time of its immersion is increased or diminished. By this process, the germs of destruction are found to be quite destroyed, very much on the same principle that the various articles of food are prepared in hermetically sealed vessels, or calf-foot jelly bottled and kept in a perfect state of preservation. When the meat has thus been allowed to remain a sufficient length of time

in the highly-heated paraffin, it is removed, and immediately dipped into a bath containing the same material, at a lower temperature, and, after two or three dippings, the process is complete. Already various samples have been prepared, and, after three months' keeping, have been cooked and found perfectly sweet, and free from any taint whatever. So successful has the process been, so far as it has been tried, in connection with experiments commenced last summer, that a company has been formed in London, under the name of "Redwood's Patents Company, Limited," where experiments are still going on with a variety of different substances—such as bacon, beef, mutton, butter, eggs, sausages, cheese, hams, etc. The Company, having secured patent rights on the Continent and in South America, hope that, ere long, choice beef and mutton will be sent home to Great Britain in a perfectly fresh state, and be sold at such prices as must of necessity prove a boon to the public generally, but more especially to the poorer portion of the inhabitants in this country. Mr. Mackay submitted to the meeting several specimens of meat prepared by the new process, including a jigot of mutton and several chops. These looked very beautiful, resembling in appearance the purest alabaster, and, though handled a good deal, remained unchanged. Some of the samples shown had been prepared five weeks, and Mr. Mackay stated that one cooked a few days previously was perfectly sweet and fresh. The following are the directions by which the preserved meat may be cooked:—"Remove the greater part of the paraffin by breaking it with a hammer or other suitable instrument, and peeling it off; then put the meat into a vessel of boiling water, when the remainder of the paraffin will melt and rise to the surface, leaving the meat entirely free from it. When it has cooled, the hardened paraffin may be taken from the surface of the water, and the meat dried with a cloth. It is now ready to be prepared for food by any of the usual methods, but it should be cooked for only half the time required for unpreserved fresh meat. The paraffin that has been removed from the meat may be kept for subsequent use, being quite unchanged or injured in any way." In closing his remarks, Mr. M. mentioned that further experiments were



being vigorously carried forward at the works of the company, near London, which, if successful, would be the means of bringing the process into very general use.—*Trans. Pharm. Society, Edin., in Pharm. Jour., May, 1866.*

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#### NEW ELECTRICAL MACHINE.

To the Editor of the *Chemical News*.

SIR:—Since my last communication to you I have turned my attention from chemical to electrical science, and seem to have discovered an inexhaustible magazine of electricity in wood! Not that I imagine for a moment that I have made any “discovery,” but rather the application of one; for who is there that does not know that dry wood insulates? while how few, if any, are aware that sparks may be drawn from its surface equal in quantity and intensity to those from “ebonite”—and even longer! If this be so, it ought to make a revolution in the price of electrical machines, for wood would only cost a twentieth the price of any other electric.

Besides cheapness, wood presents many other advantages—viz., stiffness, lightness, portability, surprising power and size; for it is evident that if this material can be put together so closely as to form but one piece, and as easily taken asunder, there can be no limit—save the growth of timber—to the construction of the most powerful machines. Enormous electrical “jars” also might readily be constructed of this material, if they should ever be required. But the great value of wood consists in its being rendered capable of remaining permanently electrical, and, therefore, permanently dry, without which its great power would count for next to nothing.

Brown paper, which, while hot and dry, exhibits equal powers, is nothing directly it is cold; while wood, which appears equally porous, retains indefinitely its electric properties. How is this? I have by me pieces of different kinds of wood, which, to my certain knowledge (after baking) have not been near any fire for two months, and yet they exhibit all the intensity of recent dessication. This great power seems to reside in the woody fibre; for if, while still hot from the oven, we coat the wood with

copal varnish, on drying, it does not show near the same power, and, what is rather difficult to understand, after the lapse of a few days, seems no more electric than wet wood, while the simple wood remains so. Oil, I believe, is supposed to attract a small quantity of moisture from the atmosphere, but how can it do so when the varnish is dry and the oil solid? Machines formed of wooden discs coated in this manner were described in the time of Ingenhouz, and that was my original intention, when, on taking the piece of wood from the fire, I thought I would just see if it were capable of itself (before varnishing) of showing attraction on rubbing, when lo! a strong spark flies off. I recollect, some ten or twelve years ago, when at school, (reading of the power of brown paper,) attempting to form a cheap machine of wood, covered with brown paper, and thought it very hard I couldn't get the slightest spark, heat or rub how I might, little imagining at the time that the wood only wanted drying to form itself the best substance. As a rubber, I employ catskin; but either (unvarnished) silk, or, still better, "vulcanized India-rubber," answer equally well. I have late mounted my machine with wooden discs, in the place of ebonite ones, and the effects must be seen to be believed. Now, if this is anything new to you, sir, perhaps you might wish to see such an instrument, in which case, you might call any day between ten and four o'clock, or else it might be sent to your address. Can you suggest any means of rendering wood permanently as well as absolutely dry? I carry on the "baking" or drying till the surface is slightly colored, but not "carbonized," in which case, at the end of two months, it appears equally electric as the first day, and that in spite of a small quantity of steam when put before the fire.

I am, &c.,

F. E. S. JERNINGHAM.

52 Cambridge Terrace, March 19.

—*Lond. Chem. News*, March 23, 1866.

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*New Electrical Machine—Electricity of Wood.*

The communication from Mr. Jerningham, which we printed in our number for March 23, was, we are sorry to find, not intended

for immediate publication. The writer, however, now kindly sends us further information on the subject, which is of great value. We have only to add that a machine on this principle was exhibited at the last *soiree* of the President of the Royal Society, and attracted much attention.

To the Editor of the Chemical News:

SIR:—The only additional information which I am able at present to supply on the subject of the electricity of wood has reference to the different capacity of different kinds of wood of being converted into electrics, and here I would caution any one who may feel tempted to repeat the experiment to bear in mind that though it be true that every kind of wood which I have yet examined would appear capable, more or less, of this conversion, yet that time is a singular and indispensable condition of this transformation, and that wood can no more be rendered “electric” by holding it to the fire for “a minute or two,” than toast is dried because it happens to be colored. It requires “doing,” like meat; and I never think of giving less than from one to two hours. And not only does it take some time, but, in general, a strong heat as well; and as for tulip wood, and perhaps one or two other very hard woods, they obstinately refuse to become electric for whole hours. After three hours, no change could be perceived, till at length, between four and five hours, of a temperature just short of actual carbonization, this variety then gave pretty strong sparks, and retains its power well.

The following are among the specimens of wood which I have as yet examined, though, doubtless, there may be many more that might with advantage be submitted for trial:—Pine, white deal, mahogany, cedar, English oak, box, English birch, Hungarian ditto, ebony, satin, white holly, pear, rose, tulip, purple wood and king wood; likewise, “pencil cedar,” American walnut, English ditto, Japanese oak, common elm, (witch elm,) partridge wood, (heart and sap,) birds’ eye maple, sycamore, acacia, yew, lime, sweet chestnut, horse chestnut, *lignum vitæ*, (heart and sap,) cocoa, black thorn, “Amboyna” fir-tree, lance, American birch, and “raspberry wood,” so called from its strong odor resembling strawberries. A specimen of wood, “name not known,” but much resembling the Zebra variety,

only much denser and heavier, was also heated, and which was the only one that was characterized by its cracking and splitting in all directions. White deal would, perhaps, form the best wood for the purpose, could it only be obtained wide enough, because I find it possible to get sparks from it with amalgam, no doubt on account of its hard smooth surface, which, however, speedily becomes coated with metal, and so cannot vie with ebonite on account of polish. Were it not for this, I believe wood would be found equal to it, as under similar circumstances, (as when catskin is used,) the power of each appears equal.

The pieces of wood I speak of were exposed between wire work secured by wire to the influence of a good fire, at from six inches' to a foot's distance from the bars for from one to two hours—during this operation, English walnut and mahogany are very apt to ignite—and, in this way, ten or a dozen pieces may readily be heated at a time, the pieces of wood measuring 8 inches by 4 or  $\approx 32$ , and  $\frac{1}{4}$  in. thick.

From this mode of operating, it will be seen that the "comparisons" must necessarily be rather rough and only approximate, though the pieces were so arranged as to be heated both sides as nearly equally as possible. Of course, had I possessed at the moment required the necessary conveniences, an oil bath would have given more reliable results; but still I consider the comparison sufficiently near the truth to prove useful. I have already dwelt upon the necessity of heating the woods a sufficient time, &c., because such directions are necessary to success, and without them it often comes to pass that in the hands of another statements and results can no more be reconciled in truth than can those of "Geology" and "Religion." But to return to the woods. The first batch were examined after three weeks or more, and the second after one—a mere matter of accident. Of the whole list, but a very limited number retained anything like all their pristine vigor. Among these may be mentioned rosewood, satinwood, kingwood, and perhaps cedar and tulipwood, mahogany not doing so well. Oak was the only wood in which the sparks mostly ran along the surface before discharge could take place, as if it contained metals; while ash (English, if not foreign,) had by this time lost all perceptible

power, not only of giving sparks, but even of attraction upon the lightest bodies! This applies also to oak, "pencil cedar," horse chestnut, "Amboyna," black thorn, sycamore, and perhaps lime; while the rest retained their power very well, as sweet chestnut, acacia, fir, white deal, *lignum vitæ*, &c., &c. Most woods appear to keep their form pretty well this size, and to be but little affected by the heat as regards "warping," with but two or three exceptions, as boxwood, *lignum*, &c., and one or two others. As for "hornbeam," it was literally doubled up. When I stated that wood presented more powerful appearances than ebonite under similar circumstances, I referred simply to the phenomenon presented by the former when two eighteen inch discs were laid one upon another, and then rubbed gently with catskin, hareskin or rabbitskin a dozen times or so; if the uppermost plate be now raised, and the knuckle presented, the discharge takes place in a single spark of great length and high intensity, while with the ebonite circulars the sparks appear much shorter, though in larger quantity.

In conclusion, I may remark I have always observed that the hardest and driest woods—showing no visible trace of moisture—invariably take the longest time and strongest heat; and this circumstance, in connection with the fact that I have very frequently obtained very unequivocal sparks from such a wood as pine while still strongly steaming before the fire, would seem to warrant the supposition that this curious conversion of wood, by long-continued heat, into an electric might depend upon something more than the mere and simple abstraction of water.

I am, &c.,

F. E. S. JERNINGHAM.

52 Cambridge Terrace, Hyde Park, April 27, 1866.

—*Lond. Chem. News*, May 11, 1866.

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## HINTS TO DISPENSERS.

By SAMUEL TAYLOR.

The subject naturally divides itself into two parts, viz.: Hints to the Head, including all those qualifications of *mind* and *temperament* which fit a man for becoming a good dis-

penser; and Hints to the Hands, under which head a few suggestions may be offered touching a general manipulation of a prescription.

Under the first of these divisions, it will be well to observe that a good general education is perhaps the most essential qualification. A dispenser's writing should be clear, distinct, and neat, at least; so that no blame may attach to him, for mistakes in reading his directions. His orthography and acquaintance with "Murray" should be unimpeachable, so that patients may not have their faith in his medicines rudely shaken by any fault of his on this score. A good practical knowledge of figures, especially the multiplying and dividing of fractions, will be of a great service to himself, and is necessary to the safety of those who have to take strong preparations coming from his hands. Under existing circumstances, *i. e.* whilst the Pharmacopœia are wholly or partially, and physicians' prescriptions almost entirely written in *Latin*, it is important that the dispenser will be at least well grounded in that language. The stigma so often laid upon us as a class, that ours is a system of "Dog Latin," is owing to a deficiency in this branch of education amongst us, and is one that comes within the province of associations like this to remove, by establishing classes for the better instruction of the younger portion of the profession in the Latin language.

The next qualification, under this division, necessary to a dispenser, is a good knowledge of chemistry and *Materia Medica*; of which two subjects, the more he knows, the pleasanter will be his duties, and the higher the position he is likely to attain amongst his professional brethren and in the world.

Posology is another branch of information in which the dispenser should be well up, as medical men are not infallible, but, like the rest of humanity, sometimes liable to err. He should therefore be able at a glance to detect an over-dose, and thus act as a check betwixt the doctor and the patient. These are qualifications of mind which can only be acquired by assiduous attention, but which must nevertheless be attained ere the dispenser can practise his calling either with comfort to himself or safety to his clients. There are, however, certain other mental qualifica-

tions, which, though not absolutely essential to the compounding a prescription, are yet highly important, and deserving attention. The most important of these perhaps is caution, from the want of which so many sad accidents have occurred, spreading dismay throughout the profession and the country. This caution or care need not interfere with dispatch in dispensing; for many dispensers, by the power of concentrating their thoughts upon the one object then in hand, have been remarkable for their quickness as well as correctness in dispensing. A few aids to correctness may here be mentioned:—that of copying prescriptions prior to making up the medicines or writing the labels, whereby the general meaning and composition of the prescription is impressed on the mind; that (where practicable) of having all medicines prepared by the dispenser, checked and sent out by either the master or another assistant; that of having the measuring of all powerful remedies, as *tr. aconiti*, *tr. nucis vomic.*, preparations of *hydrarg. oxymur.*, etc., when ordered for internal administration, witnessed. There is further, the now generally adopted arrangement of a chemist's shop, so that the dispensing of medicines is kept quite apart from the retail counter. In shops where the stock-bottles are exclusively stoppered, a tin cap fitting loosely over the stopper would probably form a sufficiently distinctive feature to distinguish poison-bottles from ordinary ones; or if caps be the covers for many of the ordinary bottles, then a different-shaped one might be used for the poisons. Still these are but aids, and the great security against accident lies in the concentrated attention of the dispenser. Quickness of perception, or a readiness to understand the general interpretation of a prescription; coolness, or a collectedness of mind under a heavy pressure of work, are also qualifications worth the cultivating.

Under the second head it may be just remarked at the outset, that a quick eye and delicate nose are both useful as checks and tests. Medicines, as generally prescribed in this country, may be classed under one of the following divisions:—liquids, comprising mixtures, lotions, liniments, gargles, etc.; pills and powders; ointments and plasters. The first class will demand the largest share of attention. In compounding medicines,

avoid using a mortar as much as possible, thereby preventing unnecessary trouble and straining, as liquids very rarely come out of a mortar in the same condition as they entered it. Many of the soluble salts, such as bicarbonate of potash, bicarbonate of soda, Rochelle salts, etc. (if of the best make) are perfectly and readily soluble in ordinary aqueous vehicles, yet how common the practice of rubbing them down in mortars, thereby running the risk of contaminating them, besides losing time. The heavy carbonate of magnesia and trisnitrate of bismuth may also, as a rule, be slipped into the bottle, without the necessity of dirtying a mortar. All soluble scaly preparations dissolve more readily in the bottle than by rubbing in a mortar. On the other hand, there are many cases in which the use of the mortar is absolutely necessary to the production of an elegant mixture; as when bulky powders are prescribed, which must be gradually rubbed up with the liquid; also when considerable effervescence takes place in mixing; when hot water is required for solution; when crystals are to be broken down and dissolved, or rubbed up when insoluble. When extracts are ordered in mixtures, the readiest means of dissolving them is by working them into a smooth liquid paste on a slab with a palette knife, and then scraping off into a measure containing more of the vehicle, and gently mixing with the knife. Oil of almonds and olive oil, when ordered with liquor potassæ, form a very nice emulsion, by diluting the alkali freely, and shaking the two together. When compounding a mixture containing ingredients which act chemically upon each other, it is advisable to keep them as far apart, and as much diluted, as possible. Chloroform, creasote, and essential oils, should, if any tinctures are present, be dissolved in them prior to being added to the mixture. In rubbing oil of cubebs or other essential oils in large quantities with mucilage, great care is necessary to avoid an insoluble compound forming: this may be prevented by judicious diluting during the process. Gallic acid should be dissolved in hot water, as also should quinine, if there be no other solvent present; but care must be taken to ascertain that there is not more of either than the mixture will afterwards retain when cold. Tincture of benzoin, tolu, and other gum-resin tinctures, should be added to mixtures nearly at



the last, and immediately shaken gently. Hydrocyanic acid should be added last of all. Nitrate of silver, diacetate of lead, and other salts decomposed by ordinary water, should be dissolved in distilled water.

The following queries may here be put :—What does a medical man intend when he expresses the quantity of any powerful medicine in a mixture by the term *guttas*? Does he really mean drops, or is he under the impression that the difference between drops and minims is so trivial as not to necessitate his particularizing? When the term “ad Octarius” occurs, which is intended, a sixteen or twenty ounce mixture? Is it generally understood that unless the prescriber specifies P.B. he means P. L?

The next class to be noticed, are pills and powders. With respect to the latter, the best mode of obtaining a uniform admixture, perhaps, is, by weighing and rubbing well together the smaller quantities first, and then adding the larger ones gradually; and in cases where large quantities of bulky powders are ordered, by sifting. As to their division into separate doses, probably a practised eye may be more safely trusted than many a pair of dispenser's scales.

Pills should be kept as small in size as practicable. In order to this, some of the soft extracts in general use might be kept dried down ready for making up, or in the case of those seldom required, by evaporating them on a small pill tile in front of an ordinary fire. Rhubarb should be made up with some thin liquid, and as much added at once as will be sufficient to make up the mass. Quinine pills may be kept down in size by reducing the quinine to a fine powder before attempting to make up.

Some substances are very difficult to incorporate. The sulphates of zinc and iron should first be reduced to fine powder, and confection of hips (that sheet-anchor of the pill-maker) be used to bind them into a mass. Creasote and essential oils are rather troublesome things to get into pill-masses when ordered in large quantities; some recommend their being absorbed by any powder ordered along with them, or added expressly for the purpose; others, that they should be added last; and others,

that they should be made into a mucilage with a few drops of strong solution of gum, prior to being absorbed by the powders. Oxide of silver should be compounded with non-saccharine substances, to prevent deoxidation. Many pill-masses, as the compound galbanum, yield readily to a warm pestle and mortar, when all other treatment fails. The objectionable smell and flavor of valerianate of zinc and other offensive medicines, may be almost entirely covered by a skilful coating of silver leaf or of balsam-tolu.

The next class of preparations—ointments—will not require many comments. They should be made uniform, both in consistency and color, and every trace of grittiness avoided by rubbing down insoluble substances with oil, or dissolving in hot water such as are soluble, as in the case of iodide of potassium and tartar emetic. A metal knife should not be used for ointments containing nitrate of mercury, corrosive sublimate, iodine, or even red precipitate, if the ointment be melted or the knife have to come in contact with the precipitate prior to its being thoroughly mixed in the ointment.

The last preparations to be touched upon are plasters, as regards the manipulation of which more may be learned by one month's practice than by twelve months lecturing. Perhaps the stiff "paper form" may be suggested, as affording a great improvement upon the old system of spreading plasters without one. Also that opium, belladonna and ammoniacum plasters should have an adhesive margin.—*Trans. Leeds Chem. Assoc.*, in *Pharm. Jour.*, May, 1866.

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## ON CINCHONA CULTIVATION IN CEYLON.

BY MR. CLEMENTS MARKHAM.

(Communicated to the Botanical Society of Edinburgh by Dr. Greville.)

Mr. Markham has been deputed by the Government to visit the planters along the western coast of India, and try to induce them to cultivate the Cinchona tree, in order that a new source of supply of quinine may be obtained. He had been visiting and reporting on the Hakgalla Cinchona Plantation, in Ceylon. He says that the site at Hakgalla is well chosen, as closely re-

sembling the habitat of the plants in South America, and he bears testimony to the skill and success with which Dr. Thwaites, assisted by Mr. MacNicol, has conducted the task of cultivating and propagating the quinine-yielding plants. Of the many thousands planted out on a bare slope at Rothschild, exposed to the full influence of light and wind, he also speaks in the highest terms as robust and flourishing. He states that the *Cinchonidæ* in India are pretty certain greatly to excel the parent plants in South America in the yield of valuable alkaloids. So striking is the improvement, indeed, that what are reckoned inferior species in the country to which they are indigenous, vie in their products with the most valuable. It has been proved that not only do the young prunings yield large quantities of quinine, but that by encouraging the growth of Moss and Lichens on the stems, the quantity of alkaloids is increased; and more than this, that if the wounds are at once covered over by Moss, strips of bark, rich in the most valuable of febrifuges, can be repeatedly taken from the same trees without injury to their vitality. Every encouraging element, as far as cultivation is concerned, is therefore present; and to complete the inducements to the Ceylon planters to engage in the pursuit, there will be a market close to their doors. The Government of India, the largest consumers of quinine in the world, are about to establish a manufactory for obtaining the sulphate from the bark, in the Madras Presidency. The red bark of India and Ceylon will fetch as high a price as the *Calisaya* of Bolivia, the most valuable of all the barks (4s. per lb.). If the price went down to one-fourth of this sum, we have little doubt the cultivation would pay. The bark could either go to India, or it would be taken at a cheap rate to England as filling-up cargo. Not half-a-dozen years have elapsed since the first plants were introduced into India, and now they are to be found, to the number of at least a million and a half, scattered over the hill-ranges of Ceylon and India, from Hakgalla to the Himalayas—flourishing everywhere, except in the hill hollows, where actual frosts prove fatal to them. The Indian Government consider that the progress in the operations has been very satisfactory, and they congratulate Mr. M'Ivor on the important success that has attended his labors in this national

undertaking. The oldest plants which were planted out in August, 1862, are now from 8 to 12 feet in height, and from 7 to 13 inches in girth at 6 inches from the ground, well furnished with lateral branches, and present a most robust and healthy appearance. In the oldest plantations the branches of the plants, 10 and 12 feet apart, are now touching each other, and the bark is much increased in thickness. The characteristic markings of the finest Peruvian bark are becoming more and more apparent, Lichens and Mosses being fully developed. The plants are flowering freely, and perfect seeds have already been obtained: in short, there is no room to doubt that the *Cinchona* can be grown on the Neilgherries in great perfection. —*Lond. Pharm. Journ.*, April, 1866.

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#### REPORT ON THE CULTIVATION OF CINCHONÆ AT DARJEELING DURING THE MONTH OF OCTOBER, 1865.

*From T. Anderson, Esq., M. D., Superintendent Botanical Gardens, and in charge of Cinchona cultivation in Bengal, to S. C. Bayley, Esq., Junior Secretary to the Government of Bengal, dated the 3d of January, 1866.*

I have the honor to transmit herewith the Report of the *Cinchona* cultivation at Darjeeling for the month of October, 1865.

##### *Report for the month of October.*

I am glad to be able to report the continued success of the cultivation. The number of cuttings made during the month was 9615, making a total number of plants and cuttings in all stages of growth 108,962. The alterations in the mode of growing the plants from which cuttings are obtained has been completed for all the species. The full number of stock plants for cutting (10,000) has been attained in the case of *C. succirubra* and *C. officinalis*, but some months must elapse before the number of stock plants of *C. micrantha* is completed.

As I possess only 142 plants and cuttings of *C. Calisaya*, this valuable species must be cultivated under the shelter of glass for some years longer. During the month 14,500 well-rooted plants of *C. succirubra* were planted in open-air beds, from which they will be transferred in April next to the open ground.

2. The first public sale of Cinchonæ took place on the 2d of October. Three purchasers attended, who among them bought the 1000 plants offered for sale at the upset price of four annas each: only *C. officinalis* was sold.

3. The temperature of the past month has been considerably lower than that of September, the greatest difference being in the mean minimum temperature from the clear cloudless nights favoring radiation.

4. The rain-fall has also greatly diminished; only one and a half inches of rain were recorded during the month, making a total fall of 153·08 inches from the first of January. The mean maximum temperature at the fourth plantation was 80·06. The mean minimum 59·19, and the mean temperature of the month 69·62.

5. At the fifth and lowest plantation, nine observations of the minimum thermometer give a minimum temperature of 61·62.

6. This decrease in the temperature, accompanied by dryness of the atmosphere, has affected the growth of the plants. The period of rest is rapidly approaching when the plants will remain almost dormant.

*Number and Distribution of Cinchona Plants in the Government Plantations of Darjeeling on the 1st of November, 1865.*

Name of Species of Cinchonæ.	Number in permanent plantations.	Number of stock plants for propagation.	Number of seedlings or rooted cuttings in nursery beds for permanent plantations.	Number of rooted cuttings in cutting-beds.	Number of cuttings made during the month.	Total number of plants, cuttings, and seedlings.
<i>C. succirubra</i> .....	389	10,000	14,500	14,145	4109	43,134
<i>C. Calisaya</i> .....		23		94	25	142
<i>C. micrantha</i> .....	15	2,539		1,426	290	4,264
<i>C. officinalis</i> , including varieties.....	870	10,000	8,459	31,801	5,200	56,330
<i>C. Pahudiana</i> .....	5,092					5,092
Total.....	6,366	22,562	22,959	47,466	9,615	108,962

—*London Pharm. Jour.*, April, 1866.

## ON THE APPLICATION OF DISINFECTANTS IN ARRESTING THE SPREAD OF THE CATTLE PLAGUE.

Report to Her Majesty's Commissioners,

By WILLIAM CROOKES, F. R. S.

PART I.—*Theoretical Considerations as to the Propagation of the Cattle Plague.*

1. Previous to my receiving instructions from the Royal Commission for inquiring into the origin and nature of the cattle plague, I had devoted considerable attention to the investigation of the applicability of disinfectants to the prevention or cure of this pestilence, ever since its first appearance in England, and had tried numerous experiments both in the laboratory and also on a large scale in farm-yards. I was therefore not unprepared to commence at once the practical operations which it was considered desirable to carry out.

2. As to the bare fact of the infectious\* nature of the cattle plague all are agreed. That contamination of some kind is communicated from a diseased to a healthy animal is obvious to every one; but when we inquire by what agency the disease is carried, the answers are of the most conflicting kind. Something, evidently a material substance, passes from one beast to another; but what is this something? Is it a solid, a liquid, or a gas; living or dead; an animal or a vegetable germ; a poison, virus or ferment? Each of these views has found advocates, and in favor of each something may be said.

3. There are weighty reasons for deciding that the infecting matter is neither a gas nor even a volatile liquid. The almost infinite attenuation which a gas undergoes owing to its rapid diffusion into the atmosphere, would render its supposed noxious influence imperceptible a few yards from the focus of infection. Moreover, the infection is capable of being carried considerable

\* I have throughout this Report used the word "infectious" in preference to "contagious." The limitation to actual contact involved in the word *contagious*, and the popular opinions which the use of these words foster, that some diseases are infectious and not contagious, whilst others may be contagious though not infectious, imply a far more profound knowledge of the way in which diseases are transmitted than we yet possess. I therefore prefer the wider term *infectious*, as being more applicable to our present knowledge on the subject.

distances in clothing or running water, and in a variety of ways incompatible with the behaviour of gases. For these reasons, and many others unnecessary to adduce here, it seems clear that the disease must be communicated by the agency of solid, non-volatile particles.

4. The specific disease-producing particles must, moreover, be organized, and possess vitality; they must partake of the nature of *virus* rather than of *poison*.\* No poison yet known to chemists can approach, even in a faint degree, the tremendous energy of the active agent of infectious diseases. A poison may be organic, but it is not organized. It may kill with far greater rapidity than the virus of infection, but, unlike this virus, it cannot multiply itself in the animal economy to such an extent as to endow within a few hours every portion of its juices with the power of producing similar results. A virus, on the contrary, renders the liquids of an infected animal as virulent as the original germ. Strychnine may be regarded as the type of a poison, and vaccine matter as the type of a virus.

5. Many considerations tend to show that the virus of cattle plague is a body similar to vaccine lymph, and consists of germinal matter, or living cells, possessing physiological individuality, which, if not exposed to extremes of heat, cold, or dryness, are capable of preserving their activity for a certain time outside the living organism, of adhering to material objects, and of being carried from one place to another by currents of air; each, when introduced into the blood, requires a certain time (known as the period of incubation) during which the septic germs develop and multiply, until they have so far poisoned the blood that the ordinary symptoms of disease become manifest.

The blood poisoning thus set up may legitimately be called "fermentation," it is a decomposition caused by the act of nutrition of the living cell, whereby it reproduces in incalculable numbers the specific septic germs which have given it birth. These gradually infest the blood and other animal liquids, and as the disease progresses are discharged from the skin, throat,

\* The words *virus* and *poison* are generally regarded as synonymous. It would be more convenient, and would tend to promote accuracy of thought, were the distinction here made generally adopted.

glands, &c. ; the breath, perspiration, and excreta of the animals forming vehicles for the distribution of the virus. By "living," cells is not meant living, in the sense in which an animal, or even a low form of infusoria, lives ; but living as a seed, or as vaccine matter, even when dried, may be living, inasmuch as it still possesses reproductive vitality.

6. It is by no means certain that the multiplication of these individual cells is the immediate cause of the blood poisoning. The analogy of the action of virus on the blood to that of yeast on sugar renders it more probable that this is not the fact. In the case of the best known ferment—yeast—its cells multiply by feeding upon the sugar in the liquid ; alcohol and carbonic acid being their excretions. It is therefore probable that during the multiplication of the virus cells, they, in a similar manner, impoverish and weaken the blood, by feeding upon some element in it, whilst at the same time they excrete a poison to which the symptoms of the disease may be immediately due.

7. The foregoing view differs from the prevalent notion that the virus of contagion consists of decomposing organic matter, declining from a complex towards a more simple chemical constitution, and during its degradation inducing decomposition in the neighboring particles of matter. This chemical theory at first sight appears very plausible ; but it fails to satisfy one necessary condition of the present case. It is possible to imagine that the force set free in the declension of a complex chemical molecule to a more simple form will be sufficient to raise a neighboring molecule to a structure almost as complicated as the original ; but according to this view the ferment would be constantly diminishing, whereas in reality it constantly increases in bulk. The hypothesis is therefore insufficient to explain the prodigious procreative power of the original particle. This power belongs only to the nature of an organized germ, capable of producing multiples of itself by a process of nutrition and subdivision. Thus the line of demarcation between organic poison and organized virus appears to be very clearly defined.

This necessarily brief outline of the theoretical views which have governed me in the present investigation will, it is hoped, be clearer and more intelligible after perusing the experimental



proofs which follow. They have been corroborated by numerous small laboratory experiments, as well as by practical operations at different farm-houses.

8. Whether this theory thus briefly sketched be adopted or not, or whether it be regarded as a provisional scientific artifice, it certainly includes and explains a far greater number of the phenomena of pestilence than any other hitherto propounded. Moreover, it is the theory sanctioned by the most influential of those medical philosophers who have the best right to be heard on this subject, and notably by the distinguished Registrar-General, Dr. Farr, who, by the adoption of the word *zymotic*, in his classification of diseases, has implied his adhesion to this theory.

9. Bearing upon the communicability of this disease are other questions, which hitherto have not received a satisfactory settlement. How does the virus travel? What amount of resistance to ordinary conditions of moisture and time does its vitality confer upon it? Will it propagate and multiply, outside the animal body, under favorable conditions of warmth and moisture? And can we find any chemical disinfectant or antiseptic which will readily destroy it?

The extreme communicability of the pestilence may arise either from the eminently diffusible character of the virus-cells, or from their persistent vitality, or from both conditions combined. It is proved that the *materies morbi* will adhere to clothing, and can be carried a considerable distance in it; that the breath, perspiration, and evacuations of the diseased animal are loaded with virus-cells; and that the secretions from the mouth, nose, and eyes are in a similar condition. It follows, therefore, that the sheds, in which diseased animals have stood, become impregnated with the virus, ready to settle on the clothes of every one who enters; that ponds, streams, and even wells may become contaminated through foul soakage; that a road over which diseased cattle have been driven may be poisoned along its whole distance by the evacuations and other discharges from the animals; whilst their very breath, carried by the wind, may plant the seeds of infection in all the healthy farms by which the road passes.

There is no difficulty in admitting that the infection may travel for a certain limited distance through the air, and it is even likely that it may be carried longer distances by fogs, or heavy vapors, or by the gases of putrid decomposition; but it appears in the highest degree improbable that the germs should be able to retain their vitality for any length of time in the atmosphere.

10. Sufficient data do not at present exist to decide whether the germs can propagate themselves apart from the animal. Viewing them as of the nature of a ferment, it is not impossible that they may live and multiply in other warm liquids besides the blood: but the most reasonable supposition seems to be that the presence of decaying organic matter, or the gaseous emanations from putrefying dunghills, preserves, or may even revive, the expiring vitality of germs brought by men, dogs, birds, vermin, or perhaps the wind; whilst the same causes which foster the virus cells—dirt, overcrowding, constant re-breathing of their own and the adjacent animals' breath, an insufficient supply of fresh air, the presence of ammonia and other gases of putrefaction, together with inappropriate food—may establish a deteriorated state of body, which causes the animals to fall ready victims at the first approach of the plague.

The existence of these unfavorable conditions may account for the fact that on some farms the disease assumes a character so virulent that no remedy or preservative is of any avail against it, every head of cattle being swept off one after another, each attack being fatal within three days (15, 79, 80.) In the words of a writer in the "Edinburgh Review," "a single spark of infected matter accidentally thrown into the animal economy, thus reduced, as it were, to a touchwood state, fires the mass, which burns until it is consumed."

## PART II.—*On Disinfectants generally.*

11. There appears as yet but faint hope of finding a cure for the disease, and even were medical science to supply that great boon, it would be of little use unless supplemented with vigorous disinfecting measures; otherwise it would be like attempting to put out a fire fed on all sides with inflammable materials. Disinfection must, therefore, be the first consideration, and should

be carried as far as possible short of endangering the health of the sound animals by the agents employed. Disinfectants and antiseptics have necessarily a powerful action on vital phenomena; and in some cases it may happen that an animal's vital powers are so diminished by the disease that it will not have strength left to bear the remedial treatment; but even in this case less harm will be done by its use than if the animal had been allowed to die of cattle plague.

12. Disinfection, in the widest sense of the term, includes deodorization, and means the neutralization or destruction of all substances, arising from putrefying organic matter, or emanating from diseased animals, either injurious to health or offensive to the sense of smell.

The putrefactive products of animal and vegetable matter are found to consist of some or all of the following gases and vapors:—

Sulphuretted hydrogen,  
Phosphuretted hydrogen,  
Ammonia,  
Phosphorus and nitrogen-bases of complex constitution,  
Acetic, butyric, valerianic, &c., acids,  
Carburetted hydrogen,  
Hydrogen.  
Carbonic oxide,  
Carbonic acid,  
Nitrogen,

Various organized animal and vegetable products of little or no activity, and

The special virus of infection. (The latter in an infected district.)

13. In a more restricted sense, the term "disinfectants" is used to express those agents which destroy organic or offensive matter by oxidation or analogous action; whilst under the term "antiseptics" are classed those agents which prevent chemical change by destroying the tendency to putrefy. The latter are termed, by Dr. Angus Smith, colytics, from *καλύω*, I arrest.

14. Oxidizing disinfectants are by far the best known and most popular, inasmuch as they appeal directly to popular preju-

dice, by destroying the foul odors which are the usual accompaniments of infection, whilst, antiseptics have little or no action on these gases. I hope to succeed in showing that this fallacious mode of estimating the relative value of disinfectants and antiseptics, is one which does great injustice to the latter.

15. Cleanliness, ventillation, and good drainage have been spoken of as comprising all that is required to preserve cattle from the plague. This is not correct. Due attention to these points will certainly tend to preserve the animals in better health, and will render them more fitted to sustain the exhausting action of the disease; but ventillation, cleanliness, and drainage are unavailing against the importation of the germs of disease from adjacent herds. These measures are of value as they remove what might otherwise become nurseries for infection. A germ from without, falling on to a clean dry stall, is likely soon to die; but if it meet with moisture and dirt, its vitality may be fostered, and the chance of its coming into contact with a healthy animal so much the more increased (10.) Cleanliness, drainage, and ventillation are admirable adjuncts to disinfection, but it is not safe to trust to them alone to ward off the plague. Ventillation, by allowing a greater number of cubic feet of air per minute to pass over the animals, may be, in fact, the means of conveying the infection to them. A moderately ventillated shed, in which antiseptics are freely employed, has been proved to be a place far safer for cattle than an open field; although when the animals have caught the disease the mortality appears to be less when they are turned out into an open field than when they are kept in sheds.

16. Dr. Angus Smith, by his exhaustive examination of disinfectants, has rendered it unnecessary for me to search amongst the numerous classes of possibly useful bodies for those likely to be of practical value. His results I accept in the full conviction that they are correct; and I proceed to investigate the respective merits of the comparatively small number of agents available for disinfection.

17. At the outset it is necessary to strike off at once a whole class of valuable agents which will not meet the requirements of the case. It appears to have been satisfactorily proved that the

infectious matter passes off mainly from the lungs of diseased animals, and that it attacks healthy ones through the same channels. It is suspended in the air with fogs, vapor, and gaseous products of decomposition, settling on rafters and in crevices whence mechanical purification would be unlikely to dislodge it. Partaking in this manner of the physical properties of a vapor, or of fine dust, it is clearly hopeless to attempt to combat the virus by non-volatile solid or liquid disinfectants.

18. For this reason charcoal, chloride of zinc, (Sir William Burnett's disinfecting fluid), solutions of metallic salts, and other similar substances are of very limited use. Moreover, chloride of zinc (and this is probably true of the other metallic chlorides) has been proven to possess no efficacy in destroying specific infective emanations. What is wanted is a volatile and liquid disinfectant, which, after first acting on the excreta, the floors, walls, and stalls of the shed, will, by its quality of gaseous diffusion, rise into the air, enter the lungs of the animals, pervade the whole building, and attack the hidden germs of infection, which otherwise would escape. In addition to this the agent must do its work with as little inconvenience as possible to the cattle and their attendants.—*Lond. Chem. News*, May 25, 1866.

(To be continued.)

# RHIGOLENE,\*—A PETROLEUM NAPHTHA FOR PRODUCING ANÆSTHESIA BY FREEZING.

[Read before the Boston Society for Medical Improvement, April 9th, 1866,† and communicated for the Boston Medical and Surgical Journal.]

BY HENRY J. BIGELOW, M. D.,

Professor of Surgery in the Massachusetts Medical College.

The above name is proposed as convenient to designate a petroleum naphtha boiling at 70° F., one of the most volatile

\* Rhigolene, from *ρῑγος*, *extreme cold*, to which is added the euphonious termination of most of the other petroleum naphthas.

† About three weeks after my first experiments with rhigolene, I first learned that Prof. Simpson, of Edinburgh, had lately employed "kerosolene" for this purpose.

liquids obtained by the distillation of petroleum, and which has been applied to the production of cold by evaporation. It is a hydrocarbon, wholly destitute of oxygen, and is the lightest of all known liquids, having a specific gravity of 0.625. It has been shown that petroleum, vaporized and carefully condensed at different temperatures, offers a regular series of products which present more material differences than that of their degree of volatility,\* and that the present product is probably a combination of some of the known products of petroleum with those volatile and gaseous ones not yet fully examined, and to which this fluid owes its great volatility. A few of these combinations are already known in trade, as benzolene, kerosene, kerosolene, gasolene, &c., all of them naphthas, but varying with different manufacturers. I procured, in 1861, a quantity of kerosolene† of four different densities, and found the lightest of them, the boiling point of which was about 90°, to be an efficient anæsthetic by inhalation.‡ When it was learned here that Mr. Richardson, of London, had produced a useful anæsthesia by freezing through the agency of ether vapor, reducing the temperature to 6° below zero, F., it occurred to me that a very volatile product of petroleum might be more sure to congeal the tissues, besides being far less expensive, than ether. Mr. Merrill having, at my request, manufactured a liquid of which the boiling point was 70° F., it proved that the mercury was easily depressed by this agent to 19° below zero, and that the skin could be with certainty frozen hard in five or ten seconds. A lower temperature might doubtless be

\* See Researches on the Volatile Hydrocarbons, with references to authorities, by C. M. Warren. American Journal of Science and Arts, July, September and November, 1865.

† The kerosolene was furnished by Mr. Merrill, Superintendent of the Downer Kerosene Oil Co., South Boston.

‡ An account of these experiments may be found in this JOURNAL, July 11, 1861. Reference is made to them in a paper "On the most Volatile Constituents of American Petroleum," by Edmund Ronalds, Ph. D., in the Journal of the Chemical Society, London, February, 1865. Mr. Ronalds there states that "the most volatile liquid obtained by collecting the first runnings from the stills employed in the process of refining petroleum has a specific gravity of 0.666." He had also received a specimen of "kerosolene" from Prof. Simpson, of Edinburgh, at 0.633. It will be observed that the Rhigolene has a specific gravity of 0.625.

produced, were it not for the ice which surrounds the bulb of the thermometer. This result may be approximately effected by the common and familiar "spray producer," the concentric tubes of Mr. Richardson not being absolutely necessary to congeal the tissues with the rhigolene, as in his experiments with common ether. I have for convenience used a glass phial, through the cork of which passes a metal tube for the fluid, the air-tube being outside, and bent at its extremity so as to meet the fluid-tube at right angles, at some distance from the neck of the bottle. Air is not admitted to the bottle, as in Mr. Richardson's apparatus, the vapor of the rhigolene generated by the warmth of the hand applied externally being sufficient to prevent a vacuum and to ensure its free delivery;  $15^{\circ}$  below zero is easily produced by this apparatus. The bottle, when not in use, should be kept tightly corked, a precaution by no means superfluous, as the liquid readily loses its more volatile parts by evaporation, leaving a denser and consequently less efficient residue. In this, and in several more expensive forms of apparatus in metal, both with and without the concentric tubes, I have found the sizes of 72 and 78 of Stub's steel wire gauge to work well for the air and fluid orifices respectively; and it may be added that metal points reduced to sharp edges are preferable to glass, which, by its non-conducting properties, allows the orifices to become obstructed by frozen aqueous vapor.

Freezing by rhigolene is far more sure than by ether, as suggested by Dr. Richardson, inasmuch as common ether, boiling only at about  $96^{\circ}$  instead of  $70^{\circ}$ , often fails to produce an adequate degree of cold. The rhigolene is more convenient and more easily controlled than the freezing mixtures hitherto employed. Being quick in its action, inexpensive and comparatively odorless, it will supersede general or local anæsthesia by ether or chloroform for small operations and in private houses. The opening of felons and other abscesses, the removal of small tumors, small incisions, excisions and evulsions, and perhaps the extraction of teeth, may be thus effected with admirable ease and certainty; and for these purposes surgeons will use it, as also, perhaps, for the relief of neuralgia, chronic rheumatism, &c., and as a styptic, and for the destruction by freezing of erec-

tile and other growths. But for large operations it is obviously less convenient than general anæsthesia, and will never supersede it. Applied to the skin, a first degree of congelation is evanescent; if protracted longer, it is followed by redness and desquamation, which may be possibly averted by the local bleeding of an incision; but if continued or used on a large scale, the dangers of frost-bite and mortification must be imminent.\*

It may be superfluous to add that both the liquid and the vapor of rhigolene are highly inflammable.—*Boston Med. Surg. Journ.*, April 19, 1866.

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#### WHOLESALE LEAD POISONING.

##### *A Frightful Tragedy in the Walkill Valley.*

It is now nearly two months since the people residing along that portion of the Walkill Valley which lies in the western part of Orange County, New York, were attacked by a disease which for some time baffled the skill of the physicians, they being at a loss to divine the cause. The malady, it is true, exhibited the most positive symptoms of lead poisoning, yet all the sufferers stoutly denied having used anything that could, in their estimation, have been contaminated with lead, even in its mineral condition. In some cases, whole families were stricken down, while in others, only one or two members of a family were attacked. Sometimes the disease assumed a violent form, and caused death; and again it was of a milder type, and the patients were relieved. To-day, hundreds are suffering from its effects, many of whom will never be able to do anything, and will in time waste away and die, the victims of this terrible disease.

The symptoms most prominent in these cases have been obstinate constipation, severe pain in the abdomen, nausea and persistent vomiting, colic, difficulty in voiding urine, and, in many instances, the evacuations being mingled with blood, pain and heat in the region of the kidneys, cramps and partial paralysis of the upper extremities, and an anxious, gloomy expression

\*The Rhigolene, from the Downer Kerosene Oil Co., may be obtained of Metcalf & Co., 39 Tremont St., Boston.



of countenance. The above are the symptoms which have been present in a greater or less degree of prominence and severity in every case.

Professional men at once saw that these symptoms pointed to, and were characteristic of, lead poison; but it was also observed that some or all of them were encountered in other and far different forms of disease, as in *colica enteritis*, (inflammation of the intestines,) *hematuria*, (bloody urine,) *dysuria*, (difficulty in voiding urine,) and other conditions of the system, in which spasm, nervous disorder and paralysis manifest themselves. The only diagnostic symptom which, regarded by itself, was conclusive as to the lead poison, was the blue line at the margin of the teeth, which has been present in almost every case. The doctors were sorely perplexed, but, in about two weeks after the first violent cases came under their notice, they had, by careful study, traced the lead in the system, so that there was no longer any doubt on *that* point. It now remained to ascertain the source from whence it came.

After considerable research, it was found that the lead was conveyed into the stomachs of the sufferers by bread and meal; and, as a greater part of those staples were manufactured at the mill of a Mr. Marsh at Phillipsburg, an investigation was at once made in that direction, and the following facts were elicited, greatly to the surprise of every one, the miller himself included:—

It appears that Mr. Marsh had gained an enviable notoriety for the superior quality of his flour, and that the farmers, for many miles around, were in the habit of bringing their wheat and corn to his mill to be made into flour and meal. Aside from this, he exported largely, so that his mill, which has four run of stone, was kept constantly going—by night as well as by day. One set of these stones was set apart for his “custom” work. This was an old set, constantly needing repairs, and large cavities frequently manifested themselves, which, instead of being filled up with the cement generally used for that purpose, were filled with common lead. Some of these holes were as large as a hen’s egg, one, we are informed, being as large as the palm of a man’s hand. If, when filled, the lead projected above

the surface of the stone, it was hammered down level. They were then adjusted, the grain was run in, and the motion began and was gradually increased, until a very high rate of speed was attained. Of course, the attrition caused by this velocity detached particles of lead from the stone, and mingled them almost imperceptibly with the flour. Each moment increased the amount, so that to every pound of flour there was enough lead imparted to make small buckshot. With the enormous business of Mr. Marsh, the reader can imagine how much lead was being distributed throughout the surrounding country, to be absorbed into the systems of those who partook of the flour.

The lead in this form was comparatively harmless, but when fermented and subjected to the baking process, it was immediately transformed into carbonate of lead—the deadliest of all lead poisons. Bread of this kind was but little better than bread spread with white lead as a substitute for butter.

Were it not for the fact that the lead was taken in such large quantities as to produce a counter state of action, hundreds would have died before the cause could be discovered.

As soon as it became apparent that the disease sprang from the bread of which the sufferers had partaken, Dr. Darrance and Mr. King, a very skilful chemist of Middleton, at once determined to analyze the flour. Samples were procured, and to their astonishment they found that the lead could be discerned with the naked eye. Next, a microscope revealed it beyond a doubt, and, as a still further proof, it was subjected to some six standard tests, each one showing the presence of lead in large quantities. After these tests, all the flour which had come from Marsh's mill, was immediately returned to him, and the mill ceased running; but the mischief was already done, the seed had been sown, and the fruit was coming forth at an alarming rate; the young and old were stricken down, those who were afflicted with any chronic disease being the greatest sufferers. Of course, a panic was the result, and the doctors were kept busy day and night. I do not care to pain your readers with a recital of the terrible agonies endured by these unfortunate people, but the scene throughout a radius of from 20 to 30 miles of the country were truly heart-rending. Only

those who have suffered can form any idea of the horrors, the inward fires which were consuming the patients, or the agonizing cramps that contracted every muscle of their weakened frames.

Fortunately, the bakers of the place had purchased their flour from the Western States, or the disease would have spread to a much greater extent. Many of the grocers, as well as private families, were in the habit of receiving their supplies regularly from the mill, and, of course, all who used them were afflicted.

To-day, I have visited most of the leading physicians here, and append a tabular statement of the number of cases treated by each from the middle of March to the present time:—

Dr. Darrance . . . .	40	Dr. Smiley, about . . .	30
Dr. Everett . . . .	51	Dr. Wright, about . . .	45
Dr. Johnson . . . .	38		—
Dr. Bradner (severe) . .	9	Total . . . .	213

This only includes the region in the immediate vicinity of Middleton, and does not embrace Goshen and its environs; but I am informed that there have been over 100 cases in that neighborhood. One of the sad cases here is that of Col. Wickham, Justice of the Peace, and his wife. He will probably never recover fully from the effects, and Mrs. Wickam, who has for a long time been in delicate health, is wasting away to the grave under the influence of this frightful poison. A well-known employé of the Erie Railroad Company has died from its effects. A child of Dr. Johnson has also died. This case was a very peculiar one. It appears that the child had been fed upon the milk of a new milch cow, which usually gave 14 quarts of milk daily. About two months ago, the child was affected strangely, but at the time nothing was thought of its symptoms. About this time, the milk began to fail, and no cause could be assigned. Dr. Johnson partook freely of gruel made from the milk of this cow and meal prepared at Marsh's mill. After taking it, he vomited copiously, but did not charge it to the gruel. The child being fond of the gruel, it was given to her, and, after eating it, she was seized with convulsions at intervals, and, despite all the medical skill employed, died. The meal was lead-poisoned, and so was the milk, for the cow was fed upon feed ground at Marsh's

mill. The cow, having failed in milk, was sold and has been lost trace of.

I could fill two pages of your paper with facts which I have obtained here to-day in relation to this peculiar case of wholesale poisoning. I am informed that a large quantity of the poisoned flour has been sent to New York city to be made into starch. *If* it has been made into that article, we are safe; but if speculators have placed it in the market for sale, we shall soon see the effects. At any rate, it is the duty of the Board of Health to take some steps to ascertain if that flour is in the market *now*. There are seven cases of poisoning by this flour in New York city to-day.

Early in the morning, I leave for the mill to see the miller and obtain additional facts in relation to this sad affair. Scores of men, who, a few weeks ago, were in the full enjoyment of health and strength, are ruined for life, and totter to and fro, their faces having the appearance of dry parchment, their eyes sunken and encircled by a dark ring; their lips blue, their muscles contracted and their limbs distorted; for them to move is intense pain; relapse follows relapse, till, in time, they succumb to the effects of this fearful malady.—*N. Y. Tribune, June 1st.*

There is no question but that Mr. Marsh was entirely ignorant of the poisonous properties of lead, and supposed that because lead in its metallic form did not always cause injury, that it would not do so in any other form. He was not aware that lead, after being subjected to the process of fermentation and baking, was transformed by chemical action into carbonate of lead—a deadly poison. All may be thankful that the lead was taken into the system in such large quantities, for it was that which brought on the vomitings, and threw off very much of the poison before it had sufficient time to act with its full and fatal effect.

Having had a long interview with Mr. Marsh, our reporter drove to Goshen, where in the short time allotted to him before the starting of the train, he conversed with several persons who were acquainted with the facts stated, and all add their weight of testimony to that already furnished, showing conclusively that over 300 persons in a radius of about 20 miles have been

affected with lead-poisoned flour which came from the Philipsburg mill. This should be a warning to millers, and a caution to the buyers and consumers of flour, and physicians and Boards of Health should examine all the flour-mills of the country, and, by so doing, prevent the recurrence of such cases as we have recorded in our letters.—*N. Y. Tribune, June 2.*

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### MAGIC PHOTOGRAPHY.

Such is the designation of the latest novelty in our art-science—a designation which we borrow from a sensational advertisement in one of the daily papers. Its nature may thus be stated: Two sheets of paper are supplied to the purchaser, together with instructions. One of these sheets is albumenized, the other is a sheet of blotting-paper. There is no picture visible on the albumenized paper; but when, in accordance with the instructions given, the sheet of blotting-paper is moistened by means of a few drops of water and pressed in contact with the face of the albumenized paper, a picture immediately springs into existence. The question now arises: How is this accomplished? Light has evidently nothing to do with it, seeing that the same phenomenon occurs both in sunshine and in comparative darkness.

The following is the method by which these “magic photographs” are produced: Print a picture on albumenized paper in the usual way, taking care not to print so deeply as ordinarily. Fix the print (without toning) in plain hyposulphite of soda, wash thoroughly, and then immerse it in a saturated solution of bichloride of mercury till the image disappears. Again wash thoroughly and dry. The paper now appears like a piece of plain albumenized paper, without any appearance of a picture on it, and in this condition it may be kept for an indefinite time.

To cause the image to appear instantaneously and in more than its pristine vigor, dip the paper in a weak solution of hyposulphite of soda; or, preferably, dip a piece of white blotting-paper in a solution of hyposulphite of soda and dry it. This prepared paper may be kept in contact with the latent picture so long as moisture is excluded. When it is required to develop the image, moisten the blotting-paper with common water and press it

against the albumenized surface of the print, when, presto! the "magic photograph" is produced, and is, when washed, as permanent as many of the photographs of the present day. The image, by being again immersed in the bichloride of mercury solution, may be once more rendered invisible, and, by the hyposulphite solution, again restored as often as may be desired.

Although we believe that this process of magic photography has been patented a few weeks since, every intelligent photographer who has made himself acquainted with the past history of our art-science, knows that many years have elapsed since this "magic" process was first practised.

The amusement that can thus be introduced into the social circle by the "magic photographs" may be easily conceived.—*Journal Franklin Institute, June, 1866, from London British Journal of Photography, No. 312.*

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#### LINOLEUM MANUFACTURE.

The manufacture of this new and interesting material, which threatens to rival the india-rubber trade in the multiplicity and utility of its applications, is based on the invention of Mr. Frederick Walton, whose patents are now worked by the Linoleum Manufacturing Company, at Staines, and 45 Cannon Street, West. The word linoleum is derived from *linus* (linseed), and *oleum* (oil), from which products the new substance is made. The linseed oil of commerce is solidified or "oxydized" by the absorption of oxygen, by which process it becomes changed into a semi-resinous substance. It is then combined at a strong heat with resinous gums and other ingredients, and the substance thus obtained has all the appearance and many of the properties of india-rubber.

"Those who are conversant with the uses of the pliable elastic gums readily perceive the wide field of usefulness that any materials possessing such properties is designed to occupy, more especially as the price of the new substance is much lower than india-rubber or gutta-percha. Linoleum can also be dissolved into a varnish or cement in the same manner as india-rubber, and in this form can be employed in the manufacture of material for

water-proof clothing. As a varnish or paint for protecting iron or wood, or for coating ship's bottoms, it is said to be admirably adapted, as it dries rapidly, in fifteen or twenty minutes, and adheres with singular tenacity. As a cement for uniting substances, such as wood with iron, or wood with wood, it is very effective, and has similar properties to the marine glue made from india-rubber and shellac. Singularly enough, linoleum can also be vulcanized or hardened by exposure to heat. By this means it is made as hard as the hardest woods, and rendered capable of receiving a high polish without the aid of varnish or any other extraneous substance. In this condition it can be filed, planed, or turned as easily as wood, and employed in many of the various ways for which wood is used. Or it can be moulded in heated dies to any desired form, as for example, flax-spinners' bosses, sheaves for ships' blocks, surgical instrument handles, picture frames, mouldings, veneers to imitate marble, ivory, ebony and other woods. Combined with emery, it forms a grinding-wheel having extraordinary cutting or abrasive power. Very dissimilar are some of the uses to which the new substance can be applied. Carriage-aprons, cart-sheeting, sail-covers, reticules, tarpauling, printers' blankets, gas-pipes, telegraph supports, washable felt carpets, table covers, paints for carriages or for printing floor-cloth, or enamels of any color for enameling papier-mache or metals. These are only some of the many uses to which linoleum may be applied.

“The manufacture has, however, hitherto been chiefly confined to the development of the floor-cloth trade, for which the new material has proved itself well adapted. Linoleum floor-cloth is produced by combining the linoleum with ground or powdered cork, which is rolled on to a stout canvas, the back of the canvas being afterward water-proofed with a cement or varnish made from the solidified or oxydized oil before referred to. The combined fabric so manufactured is then printed by means of blocks in every variety of pattern, in the ordinary way. The floor-cloth thus produced is pliable, and comparatively noiseless to walk upon. It washes well, preserves its color, and can be rolled up like any ordinary carpet. Besides being very durable—the component parts being almost indestructible except by fire—it will

not decompose by heat or exposure to the sun or air, as is the case with india-rubber. It is therefore better adapted than that substance for hot climates. To the chemist, engineer, and manufacturer, linoleum offers quite a new substance for experiment, and no doubt, as it becomes better known, the various uses to which it may be applied will be more fully developed and appreciated. The patentees, we understand, are prepared to grant licenses for the manufacture of some of its applications, such as varnishes, cements, and the hard compounds above mentioned. Important results may therefore follow the introduction of this new and valuable substance."—*Druggists' Circular*, June, 1866, from *Mechanics' Magazine*.

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#### ACTIVE PRINCIPLE OF SENNA.

Prof. Dragendorff and Mr. Kubly, of Dorpat, have succeeded in separating from senna leaves the true active purgative principle, an acid to which they have applied the name of cathartic acid, formerly employed for an impure substance to which the active properties were ascribed. This acid principle is insoluble in water, strong alcohol, and ether, but enters into the watery infusion combined with alkaline and earthy bases. Acids, with the exception of tannin, precipitate it from its solutions in dilute alcohol. The principle is obtained in an impure form by treating the syrupy extract, obtained *in vacuo* from a strong watery infusion, with renewed portions of absolute alcohol, rejecting the first precipitate, but collecting the subsequent ones, which are then purified by repeated solution in water and reprecipitation by means of absolute alcohol. It is finally purified by dialysing it with moderately strong muriatic acid on parchment paper, cathartic acid possessing strongly colloidal properties. It contains both nitrogen and sulphur, and is a glucoside, since treatment with acids in the heat, caused splitting into another (cathartogenic) acid and sugar. Alkalies, in the heat, likewise act destructively.

The ammonia salt of cathartic acid gives a brownish, flocculent precipitate with salts of silver, and a similar one with protochloride of tin and chloride of mercury; sulphate of copper and ace-



tate of lead likewise produce precipitates ; tartrate of antimony, tannin, yellow and red prussiate, none. The minimum dose of the pure acid was found to be about one and a half grains, which causes several stools, with decided griping.—*Druggists' Circular*, June, 1866.

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## Varities.

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*On the adulteration of Resin of Jalap with Aloes.*—M. Daenen (Bull. Soc. Pharm. Brux.) calls attention to a specimen of resin of jalap, which he was led to suspect, by its bitterness, not to be pure. It was friable, and gave a yellowish gray powder : nearly insoluble in ether, sulphuret of carbon or chloroform ; entirely soluble in alcohol of 28° Baumé, and partially soluble (30 per cent.) in distilled water, liquid ammonia, and an aqueous solution of carbonate of soda, when pure resin of jalap is insoluble in these three last menstrua. It also afforded carbozotic acid by the action of nitric acid, and was not affected by chlorinated soda solution in a manner to indicate guaiac.

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*Syrup of Copaiba and Syrup of Cubebs* in diphtheria and croup, as used by M. Trideau.—The following is the recipe for the syrup :

Take of Copaiba, two troy ounces and a half.

Gum Arabic, in powder, five drachms.

Water, twelve and a half drachms.

Essence of Peppermint, sixteen drops.

Syrup of Sugar, twelve and a half troy ounces.

Emulsione the copaiba with the water and gum, then add the essence, and lastly the syrup, and mix. For adults half a table-spoonful of the syrup of copaiba every two hours ; besides a table-spoonful of simple syrup used as the vehicle for 15 grains of powdered cubebs recently powdered, given also every two hours in the intervals of the dosing with copaiba.

In serious cases the doses of cubebs may be carried to six drachms in twenty-four hours, and for children three drachms.

It sometimes happens, after twenty-four hours' use, the copaiba will not be tolerated by the stomach ; when it should be temporarily suspended. Two or three drops of laudanum in every ounce of syrup corrects this difficulty to a great extent. This medication was employed by Dr. Trideau in the prevalence of a serious epidemic in the department of Mayenne, with great success.—*Repertoire de Pharmacie*, Mars, 1866, p. 357.

*Syrup of Pepsin with Bitter Orange Peel* of M. Besson.—Take the aqueous infusion or soluble portion of fifty veal rennets, and evaporate in vacuo until the residual liquid weighs 74 troy ounces. To this add 'of lactic acid 170 grains, spirit of oranges three ounces, hydro-alcoholic extract of Curaçao (bitter orange peel,) three ounces and a quarter; filter through paper, and then dissolve in the liquid 144 troy ounces of sugar. Strain through muslin, and bottle.

An ounce of this syrup contains  $2\frac{1}{4}$  grains of acidified pepsin, that is to say, as much as three doses of fifteen grains each of the amylaceous pepsin of Boudault and Corvisart. Finally, it has an advantage over the powder of retaining during many months, or even years, its fermentable properties.—*Jour. de Chimie Medical et de Rep. de Pharm.*

*On Vanillin.* By M. Stokkeby (*Zeitschr. Chem.*, 1865, 467).—The results of this experimenter confirm in general those published by M. Gobley (see page 130, vol. xxxi. of this Journal,) on *vanillin*. The principle which gives the character of *frost* is exempt from nitrogen, is slightly acid, but does not decompose the carbonates. M. Gobley called it *vanillin*, but M. Stokkeby *vanillic acid*.

The analytical results of the latter differ from those of the former, whilst the properties are sufficiently similar to establish their probable identity.

According to Gobley, its formula is  $C_{20}H_{16}O_4$ , whilst that of Stokkeby is  $C_{34}H_{22}O_{20}$ , the analyses being made with the substance dried at  $140^{\circ} F$ .

According to the latter author, vanillin dissolves in an equal weight of boiling alcohol or ether, but at  $59^{\circ} F$ . one part of vanillin dissolves in  $6\frac{1}{2}$  parts of ether, sp. gr. .730, and in  $5\frac{2}{3}$  parts of alcohol .823. It is soluble in 11 parts of boiling water and in 198 parts at  $59^{\circ} F$ . Sesquichloride of iron communicates to all its solutions a deep violet color. Its fusing point appears fixed at  $180^{\circ} F$ . Sulphuric acid dissolves it with a green color, which becomes red by heat. Nitric acid transforms it into oxalic acid.

Vanillin is volatilizable with the vapor of water. When the distilled water is shaken with ether, and the ether separated and evaporated, crystals of vanillin are obtained.

The author also investigated the other constituents of vanilla. It yields to ether resin, wax, fixed oil and a form of tannin, greening the salts of iron. The residue contains some vanillin, gum and saccharine matter, phosphates and sulphates, but neither albumen or starch.—From *Jour. de Pharm., Janv.*, 1866.

*Two new Alkaloids in Aconitum lycotonum.*—M. Hubschmaun has extracted two alkaloids, which he calls *acolytin* and *lycoctonin*, from this plant. The first is a white powder, insoluble in ether, but soluble in water and alcohol. The lycoctonin is crystallizable, very soluble in alcohol, and dissolves but little in ether and water.

*Method for assaying the purity of Arrow Root from the Maranta.*—M. Albers (*Archiv. der Pharm.* and *Dingler's Polytech. Jour.*) gives the following method for discovering the presence of wheat or potato starch in the arrow-root of the Maranta. The following is the process:

Take one part of fecula, and mix it with three parts of a proof liquor, consisting of two parts of chlorohydric acid, sp. gr. 1.120, and one part of water, at the ordinary temperature. In three or four minutes pure arrow-root will not be affected by the acid liquor, but wheat or potato starch, on the contrary, will be changed to a transparent gelatinous mass, which becomes fluid by the further action of the acid, transforming the starch jelly to dextrine. When potato starch is the adulterant, it evolves a peculiar odor, well known to those who have made dextrine from it. When a mixture thus exists, the true arrow-root granules will subside as the gelatinized adulterant is converted to dextrine, and may be separated by a strainer, washed, dried and weighed, and the relative amount of adulteration may be judged of approximately by the consistence of the jelly as at first developed.—*Jour. de Pharm.*, 218 *Fevrier*, 1866.

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*Urea a normal constituent of Cows' Milk.*—M. Lefort announces (*Jour. de Pharm.*, March, 1866, p. 177,) the existence of urea in the milk of healthy cows. From 10 litres ( $2\frac{1}{2}$  gallons) of this milk he obtained 23 grains of nitrate of urea, easily characterized by its crystals and by its combination with binoxide of mercury.

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*Alloys of Manganese.*—In Germany M. E. Prieger has commercially prepared alloys of manganese with iron or copper possessing valuable properties, and the application of which are constantly improving in number and utility. To prepare the alloys of iron and manganese (ferro manganese), he made a mixture of pulverized oxide of manganese, charcoal dust (corresponding in quantity to the oxygen of the oxide) and of metallic iron sufficiently broken up, such as minute grains of cast-iron filings or turnings of iron or steel, &c.; the mixture was put into a graphite crucible, which would hold from 15 to 25 kilogr., and covered with a coating of charcoal dust, sea salt, &c., then heated for a few hours at a white heat. After cooling there was at the bottom of the crucible a metallic homogeneous mass, containing but very insignificant quantities of foreign bodies. Of these alloys the most important are those containing 2 equivalents of manganese to 1 of iron, and 4 equivalents of manganese to 1 of iron, and corresponding to 66.3 per cent., and 79.7 per cent. of manganese. Both are harder than tempered steel; they are capable of receiving a very high polish, they melt at red heat, and can be easily poured; they do not oxidize in the air, and even in water only superficially; their white color is of a shade between steel and silver. Alloys of copper and manganese are similarly obtained; they resemble bronze, but are much harder and more durable. Alloys of tin are very fusible, durable, and easy to work; in

color and brilliancy they may be compared to silver. The iron and manganese alloy furnishes a very simple means of adding to iron or steel a given amount of manganese; by the addition of from 1.10 to 5 per cent. very satisfactory results are obtained.—*London Chem. News*, Jan. 5, 1866.—*Deutsche Industrie-Zeitung*, clxxv., 184.

*Mining Statistics of Great Britain for 1864.*—

	Produce of mines.
Coal, . . . . .	92,787,873 tons.
Iron ore, . . . . .	10,064,890 "
Pig iron, . . . . .	4,767,951 "
Copper ore, . . . . .	214,604 "
Metallic copper, . . . . .	13,302 "
Lead ore, . . . . .	94,433 "
Metallic lead, . . . . .	91,283 "
Silver (from lead ore), . . . . .	641,088 ounces.
Zinc ores (nearly all sulphuret), . . . . .	15,407 tons.
Metallic zinc, . . . . .	4,040 "
Iron pyrites (for sulphuric acid and soda works), . . . . .	94,458 "
Tin ore, . . . . .	15,211 "
Metallic tin, . . . . .	10,108 "
Gold (from Merionethshire), . . . . .	2,887 ounces.

The gross value of the above mineral products was £39,979,837. There were 2,351,342 tons of coal taken to London in 1864 and 1,786,713 tons in 1863. Eight and a half millions of tons of coal were exported in 1864, and nearly half a million of tons of iron.—*Athen.*, Aug. 19 —*Silliman's Journal*, November, 1865.

## American Pharmaceutical Association.

The fourteenth Annual Meeting of the American Pharmaceutical Association will be held in Detroit, Michigan, on Wednesday, August 22d, at 3 o'clock, P. M. The objects of the Association are now so well known, that it is believed a simple notice is all that is needed to insure a full attendance of its members. In order to facilitate the business of the meeting, it is hoped that all members of Committees having reports to make, or any members desiring to offer any papers, will be prepared to present them at an early period of the meeting. Those unable to attend, are requested to send them in season to the care of Frederick Stearns, Esq., Detroit, Michigan.

HENRY W. LINCOLN,

President A. P. A.

Boston, June 11th, 1866.

## Editorial Department.

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**MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.**—The time for the convening of this body is rapidly approaching, as the adjournment was to Wednesday, the 22d day of August, 1866, at Detroit, Michigan. By a letter just received from Mr. Stearns, we are informed that the meeting will convene in the Supreme Court Room, and occupy it during the sessions. It is central and convenient. The hotel recommended is the Russell House, also central. The location is unusual, but readily accessible, both from east and west, and offers much of interest to the traveller from its proximity to the great lakes. For eastern members a visit to Niagara will of course be included, and to those whose leisure and means admit, the Lake Erie, St. Lawrence and Champlain route of return may be adopted. Others may be induced to proceed yet further north-west and north, and visit the interesting region of Lake Superior, or make the round trip to Chicago by steamer. For the information of such, we are able to state that the large steamer Ironsides will leave Detroit at 2 P. M. on August 24th, bound to Superior City, via Lake St. Clair, Lake Huron, Sault St. Marie, Marquette, Eagle Harbor, Ontonagon, &c., and make the trip there and back in about ten days, and at a cost of about \$45. Those who prefer it can leave the steamer at Marquette, on their return, and proceed to Chicago by rail.

Of the meeting itself we hope much; many valuable answers to queries will no doubt be presented, and several important reports be read. Our St. Louis friends, on whom mainly the Report on the Progress of Pharmacy devolves, have doubtless been active in its preparation; and the Committee on the drug-market have had a fair opportunity, in the abundant importations during the past year, to determine the various points of interest to the Association which their duty involves. Much should be expected of this committee, as the members are well qualified for the task, and well located for carrying it out. Those members who have accepted queries will aid the Association, and help on its usefulness by promptly meeting their engagements, and avoid this year a repetition of the distasteful task of recording negatives, and presenting an attenuated volume of proceedings. Last year the meeting at Boston was one of the most interesting we have had to those who attended, but far less so to the absent, from the sparsity of papers. Let all make an effort to go, or if that be impossible, to send a contribution.

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**PROF. JOHN M. MAISCH.**—The vacancy in the Philadelphia College of Pharmacy, occasioned by the resignation of the Professorship of Pharmacy, by Prof. Procter, has been filled by the Board of Trustees by the election of Mr. John M. Maisch, late of the New York College of Pharmacy, and of the U. S. Army Laboratory. We know of no one who can bring to the

task involved in this appointment so large a share of practical and theoretical knowledge as Prof. Maisch, and we doubt not he will give his efforts to the promotion of the school, and the advancement of the important branch he has been chosen to illustrate. He has our hearty good wishes for a successful and useful career.

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THE METRICAL SYSTEM OF WEIGHTS AND MEASURES.—During the present session of the Congress of the United States that body has *authorized* the use of decimal weights and measures in commercial transactions, but the enactment is only permissive, not compulsory, and intended as a means of familiarizing the people with the system, so far as individual efforts may carry its introduction into use. Their harmony with our monetary system will greatly aid the understanding and adoption of metrical weights and measures; and as it is the best system yet practically introduced that is suitable for universal adoption, efforts in England and other countries have been made to get it recognized as the universal standard for the commerce of the world. This is neither the time or place to discuss metrical subjects, else we might be tempted to offer some views on the subject, yet it will be well to suggest it as a suitable subject for discussion at the next meeting of the Association, as to how far the members are prepared to urge the claims of the Decimal system on the revisors of the Pharmacopœia of 1870.

The action of Congress was probably accelerated by the report of the Committee of the National Academy of Sciences on "uniform weights, measures, and coinage," in January last, which was ordered to be communicated to the Congressional Committee and the Treasury Department. The Committee favor the ultimate adoption of a decimal system, and believe the French metrical system has fewer faults than any other yet in use. They recommend that metrical standards of weights and measures be prepared by law and distributed to the States and Custom Houses. They also suggest that the weight of a single letter be fixed at 15 grammes instead of 14.17 grammes, (half an ounce), as at present, and to make one and two-cent pieces weigh respectively 5 and 10 grammes, with diameters in a simple ratio to the metrical unit of length.

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THE NOTTINGHAM MEETING OF THE BRITISH PHARMACEUTICAL CONFERENCE.—This body will meet on Tuesday, the 21st of August, at Nottingham, and it is proposed to hold an exhibition of objects relating to Pharmacy, or having a special interest for members of the drug trade. We have received from Mr. Reynolds, of Leeds, too late for insertion, a circular, signed by the general and local Secretaries of the Conference, Dr. Attfield, R. Reynolds, and J. H. Atherton. The objects considered appropriate are chemical and philosophical apparatus, pharmaceutical apparatus and appliances of all kinds, labels, new medicines, simple or compound, and new methods or forms of administering medicines, specimens of drugs or chemicals of fine quality, and botanical speci-

mens illustrating the *Materia Medica*. Foreign preparations, official or proprietary, adulterations, dietetic articles, Pharmaceutical books, Historical relics, connected with Pharmacy, portraits, photographs, autographs, &c. The exhibition is to be open from August 21st to the 25th, inclusive. The English people are famous for exhibitions, and we doubt not that this will be an important feature connected with the conference, of the business of which, however, it is not strictly a part.

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INTERNATIONAL PHARMACEUTICAL CONGRESS OF PARIS, 1867.—In January last, M. Robinet stated to the Society of Pharmacy, that a majority of his colleagues, at the Congress of Brunswick, approved of Paris as the place of the next meeting of this triennial body. A Committee was appointed, and in February, the Society, by its vote, accepted the mission of taking all the necessary measures to arrange for the meeting in Paris in 1867. At the meeting in March, the following programme was adopted:

1. There will be held in Paris, in 1867, an international Congress of the Associations and Societies of Pharmacutists of all countries.

2. The Congress will consist of delegates from regularly constituted Societies of Pharmacy. It will have for its object the discussion of scientific and professional questions interesting practical pharmacy, and the study of the means best adapted to promote the mission and duties of pharmacutists.

3. Each Association may send three members, but these represent but one vote, but all three of the delegates may take part in the discussions. Societies or Associations, including the pharmaceutis of an entire State, may appoint three delegates for every one hundred members in the Association.

4. Delegates to a Pharmaceutical Congress are not delegates by right to the following Congress.

5. Delegates should come possessed of written credentials from the Society they represent.

6. At the first session, the President of the Committee of Organization will proceed by ballot to nominate the officers, who will consist of a President, five Vice-Presidents, a Secretary, and three Assistant Secretaries.

7. The officers will be charged with the publication of the minutes.

8. The several questions submitted to the Congress will be submitted to special Committees for examination and report.

9. Discussions will in general be conducted in French. To facilitate the deliberations, capable interpreters will be provided by the Commission of Organization.

10. No paper on questions not in the order of the day can be read without permission of the officers.

11. Decisions will be taken by the majority of votes.

12. A Committee of Organization appointed by the Society of Pharmacy

of Paris, and composed of titular members of this Society, will be charged with all the preparatory measures for the meeting of the Congress. They will receive the views, propositions and communications of all pharmacists who may desire to address them.

13. The Committee will prepare, under the direction of the Society of Pharmacy of Paris, the programme of the session of the Congress of 1867, and will publish it in good time in the greatest number possible of Journals of Pharmacy of all countries.

14. Before the close of the second session, the Congress will nominate a Committee to prepare for the third Congress.

15. Associations having the intention of being represented at this Congress are desired to send, as early as possible, the names and addresses of their delegates.

16. The Commissioner General is charged with all the correspondence appertaining to the session of 1867, at Paris. The following members of the Society of Pharmacy at Paris were elected at the meeting in April as the Committee of Organization, viz.: MM. Robinet, Guibourt, Buignet, Boudet, Gobley, Lefort, and Mialhe.

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AMERICAN SANITARY MUSEUM AT PARIS.—Mr. Abner L. Ely, of New York, has sent us a printed circular from Dr. Thos. W. Evans, of Paris, who has taken much interest in the labors of the "Sanitary Commission" as regards mitigating the horrors of war, during the operations of the Army in the late rebellion, and now desires to acquaint the European public with the great number of ingenious inventions made by his countrymen in view of relieving the sick and the wounded soldiers. We extract the following:—

"In order to realize this project, I intend to assemble in a collection the products of those inventions which have enabled the Sanitary Commission to fulfil its mission.

"The universal Exhibition that is to be opened in Paris in 1857, is certainly the best opportunity for the inauguration of this Sanitary Museum. During that exhibition no civilized nation will be unrepresented in the French metropolis. The articles exhibited in such a museum will therefore call the attention of all those who wish the welfare of mankind and acquaint all nations with the name of their inventors.

"In addressing myself to my countrymen I am firmly convinced that they will assist me in this patriotic and humanitarian enterprise. Although I am willing to purchase all such articles as may be useful, I shall gratefully accept any objects that the inventors or manufacturers would wish to contribute.

"I therefore most respectfully request all such persons who are disposed to co-operate in the creation of the American Sanitary Museum, to address their communications to Dr. Thomas W. Evans, 15 Rue de la Paix, Paris, France, or to Mr. Abner L. Ely, 22 Pine St., New York."



NEW YORK COLLEGE OF PHARMACY.—At the annual meeting of this Institution, held March 15th, 1866, the following members were elected to office :

*President*, John Milhan ; *Vice Presidents*, Geo. C. Close, Wm. Neergaard, Isaac Coddington ; *Secretary*, P. W. Bedford ; *Treasurer*, Thos. T. Green ; *Trustees*, Geo. D. Coggeshall, John Frey, Theobald Frohwein, Arthur W. Gabaudan, Gustavus Krehbeil, Ferdinand F. Mayer, B. H. Reinold, John W. Shedden, Wm. Wright, Jr.

The following gentlemen were declared Graduates in Pharmacy, and awarded their Diplomas, viz. : Jas. G. Beach, Herman Krehbiel, Charles O. Rano, Lucien M. Rice, Eugene J. Weeks.

BRAHEE SUGAR.—A correspondent in North Carolina, being desirous of testing the merits of this substance, has written to us about it ; but all we can learn through the *Pharmaceutical Journal* is that under this name a patent medicine or nostrum, put up in papers as powders, under the name "Brahee Sugar," professes to be a great remedy for rheumatism. The Editor saw the powders, which had the appearance and taste of sugar of milk, but the agent declined giving any information regarding its origin or composition. From its tastelessness it is not improbably a mixture of hydrochlorate of propylamina and milk sugar, a point to be easily ascertained, however, by the elimination of the fishy odor of propylamin on adding liquor potassa. This is a mere supposition and suggestion, however.

A HARD CASE—Polish physicians and apothecaries, according to a circular from General Bezak, published Dec. 21st, in the "*Invalid Russe*," are commanded not to use their native language in their accounts, that their books must be kept in the Russian language, and that the labels placed upon their vials and boxes must exclusively be made out in that language. (which it is presumed the peasantry don't understand,) under a penalty of 50 roubles for the first violation of the order, 100 roubles for the second, and complete suppression of business for the third. Physicians are to be warned that they must not write their prescriptions in any other language than Russian or Latin, under a penalty of ten roubles for each prescription in Polish ; and physicians in the service of the State will in addition be deprived of their appointments. These facts, which we derive from the *Pharmaceutical Journal*, exhibit an intensity of Imperial hate that would wipe out the very language of a conquered and oppressed people even though it be used as a medium of medical aid to the sick and dying.

RECEIVED :—

*Food and Digestion*. Read before the Albany Institute, Feb. 27, 1865, by Howard Townsend, M. D., Prof. of Physiology and Materia Medica in Albany Medical College. Albany, 1866 ; J. Mansell. pp. 18. From the author.

*Twenty-third Annual Report of the Managers of the State Lunatic Asylum, for 1865.* Albany, New York, 1866, pp. 49.

*Burgoyne, Burbridge and Squire's Monthly Price Current;* 16 Coleman St., London. May 1st, 1866, pp. 16. Folio.

*Concentrated Extract of Beef*, of Tourtelot Brotlers, Chicago, Ill., prepared in vacuo at a temperature of 120° F.; put up in small tin cans. This "Extract" is soft and moist and claims to yield the "Beef-tea" more readily than the solid extract. We have not yet had an opportunity to test it.

#### OBITUARIES.

WILLIAM THOMAS BRANDE, Esq., D. C. L., F. R. S.—The able and well known chemist, who died on the 18th inst., at Tunbridge Wells, was the scion of a Hanoverian family which settled in England, *temp.* George II., his grandfather and father being both Royal Physicians here. He was born in 1786, and was educated at Westminster School. After a subsequent sojourn in Hanover, he returned to England, and became a student of St. George's Hospital, attending in 1805 and 1806 the lectures of Dr. George Pearson on Chemistry, &c., and afterwards those of Frederick Accum. Subsequently he became assistant to Sir Humphry Davy, at the Royal Institution. He, in 1808, gave satisfaction as a lecturer on chemistry at Dr. Hooper's, in Cork Street, and then joined, as teacher and demonstrator of chemistry, the Medical school in Windmill Street. In 1809 he was made a F.R.S., he received the Copley Medal in 1813, and was made Senior Secretary of the Royal Society. In 1812 he was appointed Professor of Chemistry and Materia Medica to the Apothecaries' Company, and in 1811, was elected Master of the Company. He was, in 1813, made Professor of Chemistry at the Royal Institution, and delivered lectures for many years, with great success and popularity, in conjunction with Mr. Faraday, who was also associated with him as editor, for a long period, of the *Quarterly Journal of Science*. He was, in 1825, made superintendent of the coining department of the Mint. About 1837 he was associated with Mr. Griffiths in chemical lectures at St. Bartholomew's Hospital. He was also a fellow and examiner of the London University. He was the author of a standard "Manual of Chemistry," which has been translated into many foreign languages. He was also author of "Outlines of Geology" and a "Dictionary of Pharmacy," and was editor of a "Dictionary of Science, Literature and Art." He, in 1853, received the honorary degree of D.C.L. from the University of Oxford.

WILLIAM SOUTHALL, one of the oldest members of the Pharmaceutical Society, died at Birmingham on the 16th of March, 1866, aged 69 years. He manifested much interest in the movements which resulted in establishing the Pharmaceutical Society, and for some years was one of its Council. He was always ready to take part in promoting pharmaceutical progress until precluded by ill health during the latter years of his life, and leaves a character fair and bright among his associates.

THE  
AMERICAN JOURNAL OF PHARMACY.

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SEPTEMBER, 1866.  
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MINUTES OF THE FOURTEENTH ANNUAL MEETING OF  
THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1866.

The Fourteenth Annual Meeting of the American Pharmaceutical Association commenced its sessions at the Supreme Court Room, Woodward Avenue, Detroit, Mich., on Wednesday, the 22d of August, at 4 o'clock, P. M.; the President, Henry W. Lincoln, of Boston, in the Chair. John M. Maisch, Secretary.

A Committee on Credentials was appointed by the Chair, consisting of John Butterworth, of Boston, Wm. Wright, Jr., of New York, Samuel P. Duffield, Jr., of Detroit.

Pending the action of this Committee, the members present were invited to record their names on the roll.

The Committee on Credentials reported the following delegates accredited to the meeting, viz. :

*From the Massachusetts College of Pharmacy.*—Henry W. Lincoln, Chas. A. Tufts, Robert R. Kent, Geo. F. H. Markoe, and John Butterworth.

*From the New York College of Pharmacy.*—F. F. Mayer, George C. Close, Wm. Wright, Jr., Theobald Frohwein, and Prof. P. W. Bedford.

*From the Philadelphia College of Pharmacy.*—Wm. Procter, Jr., Prof. Edward Parrish, Prof. J. M. Maisch, Jas. T. Shinn, Dr. Wilson H. Pile.

*From the Chicago College of Pharmacy.*—Albert E. Ebert, Henry Sweet, Stawell W. Gillespie, E. P. Tourtelot, Frank J. Tourtelot.

*From the Maryland College, the Cincinnati College, and the St. Louis College,* no delegates have been sent.

*From the Alumni Association of the Philadelphia College of Pharmacy.*—Evan T. Ellis, C. Lewis Diehl, Geo. W. Eldridge, and Albert E. Ebert.

Mr. Butterworth, of Boston, in the absence of Mr. Wiegand, Chairman of the Executive Committee, reported the following names of gentlemen as applicants for membership, coming duly recommended, viz. :

T. B. Dorsey, Dresden, Ohio.	Ira Lackey, Chicago, Ill.
J. F. Judge, Cincinnati, "	Will. Reinhold, " "
F. M. Odena, " "	Phil. Milleman, " "
Theodore Ronnefeld, Detroit, Mich.	M. A. Breed, Peoria, "
S. S. Stearns, " "	Alex. Garver, Navarre, Ohio.
Frank Lawrence, " "	C. J. Geiger, Canton, "
J. H. Griffith, " "	Fred. Nest, La Porte, Ind.
H. E. Hill, " "	Fred. A. Otto, Frederick, Md.
Jacob S. Farrand, " "	Robert Ormsby Sweeny, St. Paul,
T. H. Griffith, " "	Minn.
Frank E. Fletcher, " "	John Best, Central City, Colorado.
James Vernon, " "	Benj. E. Hays, " "
C. L'Hommedieu, " "	Chas. F. Fish, Saratoga Springs, N. Y.
H. S. Biddle, " "	J. L. Polhemus, Sacramento, Cal.
A. Landon, Parma, "	J. Marshall Caldwell, Augusta, Ga.
J. M. Holland, Jackson, "	Wm. P. Keffer, Philadelphia, Pa.
Josiah B. Frost, Ypsilanti, "	H. J. Menninger, Newbern, N. C.
Julius Weiss, Monroe, "	Michael Flynn, New York, N. Y.
Chas. F. Uhl, " "	Edward S. Shead, Eastport, Me.
Geo. Breck, Rochester, N. Y.	John E. Doyle, Springfield, Mass.
N. M. Woods, Indianapolis, Ind.	Jno. H. Hubbard, Cambridge, Mass.
Wm. F. Logan, Williamsport, Pa.	E. Greenville Curtis, Brooklyn, N. Y.
George H. Carey, Louisville, Ky.	W. S. Fuller, " "
Edward A. Preuss, " "	Chas. O. Rano, " "
Geo. A. Newman, " "	Eugene J. Weeks, " "
R. Vinton Steele, Pittsburg, Pa.	Lucien M. Rice, New York, "
Louis Strehl, Chicago, Ill.	John E. Peck, Newburgh, "
H. M. Wilder, " "	

On motion, a ballot was ordered. A. E. Ebert and G. F. H. Markoe were appointed tellers, who reported the unanimous election of the candidates.

On motion of the Business Committee, it was resolved that a phonographic reporter be employed to assist the Secretary, and that the minutes be reported as fully as possible, in view of their publication in the Proceedings; and James H. Slade, of Boston, was designated.

The roll was now called, and members present answered to their names, as follows:

John M. Maisch, Philadelphia, Pa.	C. Lewis Diehl, Jr., Louisville, Ky.
Jas. N. Callan, Washington, D. C.	Henry W. Lincoln, Boston, Mass.
Alb. E. Ebert, Chicago, Ill.	Wm. Wright, Jr., New York, N. Y.
Geo. F. H. Markoe, Boston, Mass.	Julius Weiss, Monroe, Mich.
E. W. Sackrider, Cleveland, O.	Chas. F. Uhl, " "
E. R. Squibb, Brooklyn, N. Y.	H. S. Biddle, Detroit, Mich.
Wm. Procter, Jr., Philadelphia, Pa.	J. M. Holland, Jackson, "
Henry Sweet, Chicago, Ill.	Josiah B. Frost, Ypsilanti, Mich.
Chas. A. Tufts, Dover, N. H.	T. B. Dorsey, Dresden, Ohio.
Geo. C. Close, Brooklyn, N. Y.	Thos. Daniels, Toledo, "
Evan T. Ellis, Philadelphia, Pa.	Alson Landon, Parma, Mich.
John Butterworth, Boston, Mass.	Robert J. Brown, Leavenworth,
Chas. A. Heinitsh, Lancaster, Pa.	Kansas.
Ferris W. Colby, New York, N. Y.	Frederick Stearns, Detroit, Mich.
Henry A. Blauw, Rochester, "	Wm. Saunders, London, C. W.
Joel A. Orne, Cambridgeport, Mass.	J. S. Farrand, Detroit, Mich.
J. W. Dietrich, Dayton, O.	Edw. C. Jones, Philadelphia, Pa.
Geo. W. Eldridge, Philadelphia, Pa.	Lyman R. Blackman, Jackson, Mich.
Robt. R. Kent, Boston, Mass.	Danl. W. Richardson, Almont, Mich.
Stawell W. Gillespie, Chicago, Ill.	Saml. P. Duffield, Detroit, Mich.
Neander M. Woods, Indianapolis,	Thos. E. Jenkins, Louisville, Ky.
Ind.	T. R. Spence, Detroit, Mich.
Geo. C. Waugh, Stratford, C. W.	John H. Griffith, " "
R. C. Kennedy, Cleveland, O.	T. H. Griffith, " "
Edw. Parrish, Philadelphia, Pa.	T. V. Heydenreich, Brooklyn, N. Y.
Saml. S. Garrigues, East Saginaw,	Wm. Johnston, Detroit, Mich.
Mich.	

The Reports of Standing Committees being in order, the following were read and laid on the table, viz. :

The Report of the Executive Committee, including that of the Permanent Secretary ;

The Report of the Committee on Scientific Queries ;

The Report of the Committee on the Internal Revenue Laws.

The Report of the Committee on the Progress of Pharmacy and that on the Drug Market were not received.

The Secretary stated that a letter had been received from Mr. Sander, informing that the prevalence of epidemic cholera in St. Louis renders it impossible for him to be present at the meeting ; and that in consequence of his increased labors it was utterly impossible for him to finish the Report on the Progress of Pharmacy in time for the meeting ; and that he had to ask a short time for finishing it for the Proceedings.

The Report of the Executive Committee was now read and accepted. The following is an abstract :

The Chairman, Thomas S. Wiegand, stated that the delay in the publication of the 13th volume of Proceedings was beyond the control of either editor or publisher, and depended on delay in furnishing the completed papers, and tardiness in replenishing the treasury. Its cost, with some other printing ordered, was about one thousand dollars.

The Report speaks of but few applications for membership in the interim, and rather discourages the increase of members, by leaving it to the spontaneous interest of the profession.

The reference to deceased members includes brief notices of J. Lindley Pyle, of Brooklyn, N. Y.; Geo. B. Fish, of Saratoga, N. Y.; Dr. Wm. J. Olliffe, of New York City; Jas. Balmer, of Baltimore; and L. Groneweg, of Cincinnati.

Mr. *Pyle* was a native of Chester County, Pa., aged 34, and a graduate of the Philadelphia College of Pharmacy—Class of 1852. In 1854 he commenced business in Brooklyn, which he conducted in a creditable manner until his decease.

Mr. *Fish* was about 28 years of age; his studies were pursued under the direction of his father, Henry F. Fish, of Waterbury, Conn. Those best acquainted with him represent him to have been a good apothecary, and possessed of a kindly disposition and courteous bearing.

Dr. *Olliffe* died in September, 1865, after a long and painful illness. He was an earnest advocate of pharmaceutical advancement, and long connected with the New York College of Pharmacy.

The Chairman refers to the appended Report of the Permanent Secretary as embodying the chief points of interest in the conduct of the affairs of the Association. After speaking of the publication of the Proceedings, this document refers to the various Institutions and Journals to which it was sent in Europe and the United States. Through the excellent arrangements of the Smithsonian Institution at Washington, packages were sent to London, Paris, Antwerp, Brussels, Switzerland, Bavaria, Berlin, Vienna, and St. Petersburg, and a number of foreign volumes returned by the same efficient agency to the Association in exchange.

The statement of the stock of Proceedings on hand shows as follows :

For 1851,	. 427 copies.	For 1858,	. 318 copies.
" 1852,	. 207 "	" 1859,	. 78 "
" 1853,	. 195 "	" 1860,	. 266 "
" 1854,	. 13 "	" 1862,	. 325 "
" 1855,	. 212 "	" 1863,	. 313 "
" 1856,	. 8 "	" 1864,	. 312 "
" 1857,	. 307 "	" 1865,	. 276 "

The Secretary further states that he issued a circular notice of this meeting to the members in the Southern States, requesting them to perfect their membership by payment of back dues, &c., in accordance with the By-Laws. [At the present meeting this action was reversed so far as to remit the dues which accrued during the war.]

The Business Committee brought forward a resolution to amend Art. II. Section 4th, of the Constitution, so that only one Vice President should sign the certificates of membership, which should also be signed by the Treasurer, or the officer issuing it. Laid over till next session.

The amendment relating to the substitution of Local Secretary for Corresponding Secretary, proposed in the resolution of Prof. Parish at the meeting of 1865, was now called up, discussed freely, and passed ; so that hereafter the foreign correspondence and that referring to the business of the Association will be conducted by the Permanent Secretary, whilst the Local Secretary, being an annual officer, always to be elected from among the members of each place of meeting, will assist the Permanent Secretary, co-operate with any local action in arranging for the meetings, shall have custody of specimens, papers, apparatus, etc., destined for use or exhibition at the meeting, and in the absence of the Permanent Secretary at the first meeting, shall officiate until another be appointed.

The appointment of the Nominating Committee being in order, the several delegations present appointed the following :

Massachusetts College,	. . .	Robert R. Kent.
New York College,	. . .	Wm. Wright, Jr.
Philadelphia College,	. . .	Wm. Procter, Jr.

Chicago College,	.	.	.	.	Henry Sweet.
Alumni Association,	.	.	.	.	Evan T. Ellis,
By the President,	{	Robert J. Brown, of Kansas.			
		Samuel S. Garrigues, of Michigan.			
		T. R. Spence, of Michigan.			

Frederick Stearns announced that invitations had been tendered to the Association to visit various objects of interest at Detroit and vicinity, among which may be mentioned Mr. Grout, of the copper smelting works; Col. Cram, for Fort Wayne; Major Cass, for the art collection of the late Lewis Cass; Geo. B. Russell, for the Detroit and Lake Superior Iron Works; Prof. S. H. Douglass, for the University of Michigan at Ann Arbor; and for the Young Men's Library, the Marine Hospital, etc.

On motion of Dr. Squibb these invitations were accepted, and the thanks of the Association tendered to the gentlemen proffering them.

President Lincoln then read the annual address, which was on motion referred to the Business Committee.

We have not space for this paper (which extends to 15 pages of cap), but must state that it discusses a great variety of topics of general or special interest, among which, after the usual reference to official reports, the subjects of an admission fee, the certificate of membership, the list of arrearages, weights and measures, an act of incorporation, motto and seal, life memberships, British Pharmaceutical Conference, and the Paris Pharmaceutical Congress claimed his attention and remarks. The President refers to a tabular statement which he has prepared, containing the number of members in each State during each year since the formation of the Association, the date and place of meeting, the number of pages of each volume of the Proceedings, and other interesting statistical matter, which he proposes as an appendage to this annual report.

The Association then adjourned to 9 o'clock to-morrow morning.

*Second Session—August 23d. Thursday Morning.*

The Association was called to order by President Lincoln at 9 o'clock, and the minutes of yesterday read and approved.



The Executive Committee suggested the names of Nobel Schröder of Chicago, and Thos. E. Jenkins of Louisville, Ky., as candidates for membership, who were balloted for and duly elected; Henry Sweet and E. C. Jones acting as tellers.

The Treasurer's Report being called for, he requested that its reading be postponed until the next session, to enable him to fill some blanks of money not yet paid to him, now in the hands of members; which was acceded to.

The Committee on Nominations being ready, the Report was read by Mr. Procter, as follows:

*For President,*

FREDERICK STEARNS, . . . . Detroit, Mich.

*For Vice Presidents,*

1st. PROF. EDWARD PARRISH, . . . Philadelphia, Pa.

2d. E. H. SARGENT, . . . . Chicago, Ill.

3d. JOHN W. SHEDDON, . . . . New York, N. Y.

*For Treasurer,*

CHARLES A. TUFTS, . . . . Dover, N. H.

*For Permanent Secretary,*

Prof. JOHN M. MAISCH, . . . . Philadelphia, Pa.

*Executive Committee,*

T. S. WIEGAND, Chairman, . . . Philadelphia, Pa.

WILLIAM WRIGHT, Jr., . . . . New York, N. Y.

ALBERT E. EBERT, . . . . Chicago, Ill.

W. J. M. GORDON, . . . . Cincinnati, Ohio.

Prof. JOHN M. MAISCH, ex officio, . Philadelphia, Pa.

*Committee on the Progress of Pharmacy,*

C. LEWIS DIEHL, Chairman, . . . Louisville, Ky.

Prof. F. F. MAYER, . . . . New York, N. Y.

G. F. H. MARKOE, . . . . Boston, Mass.

E. L. MASSOT, . . . . St. Louis, Mo.

Prof. P. W. BEDFORD, . . . . New York, N. Y.

*Committee on the Drug Market,*

WM. A. BREWER, Chairman, . . . New York, N. Y.

EVAN T. ELLIS, . . . . Philadelphia, Pa.

HENRY W. FULLER, . . . . Chicago, Ill.

J. JACOB THOMPSEN, . . . . Baltimore, Md.

SAMUEL M. COLCORD, . . . . Boston, Mass.

*Committee on Scientific Queries,*

WILLIAM PROCTER, Jr., Chairman,	. Philadelphia, Pa.
SAML. P. DUFFIELD, Ph. D.,	. Detroit, Mich.
Prof. EDWARD PARRISH,	. Philadelphia, Pa.
R. H. STABLER, M. D.,	. Alexandria, Va.

*Business Committee,*

Dr. E. R. SQUIBB, Chairman,	. Brooklyn, N. Y.
GEO. C. CLOSE,	. Brooklyn, N. Y.
ROBERT J. BROWN,	. Leavenworth, Kansas.

*Pharmacopœia Committee,*

Dr. E. R. SQUIBB, Chairman,	. Brooklyn, N. Y.
ALFRED B. TAYLOR,	. Philadelphia, Pa.
WILLIAM PROCTER, Jr.,	. Philadelphia, Pa.

On motion the report was accepted, and an election for President ordered; Evan T. Ellis and Robert R. Kent being appointed by the Chair to act as tellers.

The tellers reported the unanimous election of Frederick Stearns, of Detroit, as President for the ensuing year.

It was then moved that the Chairman should deposit an affirmative vote for the remaining officers and committees as proposed by the Nominating Committee, which was carried, when the tellers reported their unanimous election.

It was moved and carried that a committee be appointed to conduct the President elect to the chair; thereupon Professors Procter and Parrish were intrusted with that service, upon which they immediately entered. Ex-President Lincoln now vacated the chair, and presented his successor, President Stearns, to the meeting, the members rising to their feet during the ceremony, which concluded with a few earnest and appropriate remarks from Mr. Stearns, bidding the members welcome to the city of Detroit, and expressing a wish for the success and harmony of their deliberations.

The retiring officers were then tendered a vote of thanks for their zeal and efficiency during their term of service.

The report of the Corresponding Secretary, P. W. Bedford, was now read, accepted, and referred for publication.

The Secretary informs that the distribution of Proceedings to

foreign Societies and Journals, heretofore executed by the Corresponding Secretary, has been done by the Permanent Secretary, as directed last year; that the letter from St. Petersburg received last year was duly responded to; that a letter had been received from the General Austrian Apothecaries' Association at Vienna, which he had provisionally replied to, referring it to the Association for final disposition, and is as follows:

*To P. W. Bedford, Esq., Secretary to the American Pharmaceutical Association, New York:*

VIENNA, 30th Dec., 1865.

SIR,—I avail myself of the opportunity to apply to your honorable Society, in the name of the General Association of Austrian Apothecaries, for an affair I shall briefly expose in this letter. We understand that the tropical fruits are exposed for sale in their own markets in New York. Considering the acquisition of tropical productions in their natural condition an enrichment of our pharmacological collection no less desirable than scientifically important, we should feel much indebted to you for prevailing on your Honorable Society to send to us tropical fruits in the state they are sold in the market. As for the mode of putting them up, we beg you to send the oily ones in cylindrical glasses with glass stoppers, filled with alcohol of 98°, in the ratio of *one* part to *three* of water; the fat ones in salt water. At the same time you will be so kind as to make us acquainted with the expenses incurred, that we may be able to reimburse them.

Entering into a closer scientific relation with your Honorable Society is one of the most lively wishes of our Association. We make free, therefore, with calling your attention to our Journal "*Zeitschrift des Allgemeinen Oesterreichischen Apothekervereins*," published at Vienna twice a month, for an exchange of articles, as well as our pharmaceutical collection, pretty rich at present, and increasing daily by our efforts and sacrifices for an exchange of samples.

In the hope of seeing form a scientific intercourse with our brethren in profession beyond the sea, and with the assurance of true esteem, I sign,

FR. BECKERT,

*Director of the Society.*

The Secretary's report then refers to the Colleges of Pharmacy, of which he gives notices of those in Boston, New York, Philadelphia, Baltimore, St. Louis, Cincinnati and Chicago.

Prof. Parrish took occasion of the comments of the report on local colleges to argue the good results which would flow from the more general establishment of local associations. Every considerable town and city in the country should have a college of Phar-

macy. It would pay the apothecaries well to allow their clerks to attend such an institution, to say nothing of the beneficial results to the next generation, and the embryo pharmacentists now growing up. Its effect in raising the status of this or some other permanent pharmaceutical association, could not be over estimated.

Mr. Stearns said the social advantages of such establishments ought not to be lost sight of. They would serve to increase and extend the amenities of life, and rub off the rough corners and asperities of trade jealousy, which naturally exist to a certain extent among those of the same trade or profession.

On motion of Dr. Squibb, a reasonable time was allowed to Mr. Enno Sander, Chairman of the Committee on the Progress of Pharmacy, to finish his report for publication. The Committee on the drug trade not having made a report, they were excused from doing so this year.

The report of the Committee on Scientific Queries was read by the Chairman, Prof. Procter, and embraced thirty-four queries. The report was accepted and the Committee directed to get the queries accepted by members for report at the meeting in 1867.

Dr. Squibb, as Chairman of the Committee on the Pharmacopœia, read an interesting paper designated "An improved process for officinal Fluid Extract of Buchu," in which he gives a criticism on some pharmacopœial language, and explains in detail his mode of manipulation, whereby a smaller amount of alcohol will exert greater solvent effect than in the officinal process, by operating on the buchu in fractions. The report was accepted and referred for publication.

On motion, the Association proceeded to the reading and discussion of the Scientific Queries proposed at the last Annual Meeting.

QUERY 1. On Steam-heating Apparatus, operated by gas or petroleum heat, for shop use, was accepted by Prof. Procter, who stated, in reply, that he had not been able to give the time requisite to carry out his ideas of a correct answer to the query in practice, and requested it to be continued until next year, which was acceded to.

QUERY 2. "Pharmaceutical Business—its management;" was

replied to by the President, Frederick Stearns, Vice President Parrish occupying the chair during the reading of the paper, which, in an entertaining and practical manner, discussed the subject in a way to embody the results of his experience, in the manner of selecting and purchasing a stock of drugs; of arranging the store with a view to economy in trade; economy in clerk hire, etc.; and particularly in regard to an honorable and upright dealing in all branches and departments of business. He strongly opposed prostituting the business to quackery for the sake of money.

The President here announced an invitation from the Secretary of the Water Commissioners to visit their works, which was accepted and a vote of thanks passed.

Queries 3d, 4th and 5th, accepted by Dr. R. H. Stabler, of Alexandria, were not replied to. Mr. Procter said that a recent letter from Dr. Stabler had mentioned the subject of these queries, of which he had not been unmindful. In relation to the first, he believed Dr. Squibb and N. Spencer Thomas had practically replied to it, and that in relation to the other two, he had no developments worthy of communication. The queries were referred to the Committee on Queries. Dr. Squibb remarked, in reference to the 5th query, that the hair-cloth used in the linseed oil factories was the most suitable material for druggists' use with which he was acquainted.

QUERY 6. On Chrysophanic Acid, referred to Mr. Sennewald, of St. Louis; no reply being received, it was continued.

QUERY 7. In reference to Hyosciamus and Belladonna was continued to Mr. Dohme.

QUERY 8. Mr. Markoe stated that Mr. Babcock desired to be excused from the further investigation of this query relative to Glycerin, which was granted.

QUERY 9. Referred to N. Gray Bartlett, not being replied to, was continued.

QUERY 10. Relative to the consistence of Warming Plaster was replied to by George C. Close, of Brooklyn, New York, who illustrated his paper with specimens of the improved plaster.

QUERY 11. Relative to economy in Alcohol was dropped.

QUERY 12. On *Podophyllum* for general acceptance was not replied to.

QUERY 13. On commercial Extract of *Quassia* answered by Edward C. Jones, of Philadelphia, with specimens.

QUERY 14. On the substitution of Alcohol and Ether by other liquids in preparing the officinal oleo-resins, referred to Henry N. Rittenhouse, of Philadelphia, was replied to at the afternoon session, the paper not being present when called for.

QUERY 15. On Cotton Root; not answered by Mr. Sackrider, of Cleveland.

Considerable expression was called forth by a question as to the sale of fluid extract of Cotton Root, by the members present. From what was said, it appears that in Chicago and Detroit considerable quantities had been sold, and sometimes without a prescription, and it was presumed, for use as an emenagogue. In other places its use was merely occasional. It was urged that the rule applicable to ergot should apply to this preparation, viz., to require a prescription.

QUERY 16. On Oil of Tobacco for general acceptance. Was not replied to.

QUERY 17. On *Chenopodium*. Referred to Mr. Wiegand. Received no answer, and was continued, as Mr. W. had been engaged in experiments which were not completed.

QUERY 18. An Essay on *Sassafras Officinale* in its relations to Chemistry and Pharmacy, was answered by William Procter, Jr., and several specimens exhibited.

The President now announced an invitation from Dr. Duffield to visit the Harper Hospital, which was accepted.

The Chair announced the appointment of Charles A. Heinitsh, of Lancaster, Pa., H. A. Blauw, of Rochester, and J. W. Dietrich of Dayton, Ohio, as a committee for the examination of specimens and apparatus on exhibition.

QUERY 19. On a Formula for Granular Effervescent Citrate of Magnesia, suitable for general use, was answered in a communication from J. W. Mills, of Chicago, read by Albert E. Ebert. This paper attracted considerable interest, as it was illustrated with specimens of the salt. Mr. Ebert remarked in regard to the English granulated effervescing powders, that he believed

the basic and acid granules were distinct, and hence the readiness with which the powders would keep without losing carbonic acid.

A communication from the Board of Trustees of the New York College of Pharmacy, embodying the following resolution, was received and read:—

*“Resolved,* That this Board, on behalf of the members of this College, extend a hearty invitation to the members of the American Pharmaceutical Association to hold their next Annual Meeting in the City of New York.”

On motion, the communication was accepted and laid on the table for future action. (See page 404.)

QUERY 20. Relative to Cinchotannic Acid, was replied to by Prof. Procter.

QUERY 21. On Oil of Erigeron. Not answered.

QUERY 22. On Syrup of Lactucarium. Referred to Mr. Bedford. Not replied to.

QUERY 23. Relative to the production of Lactucarium in the United States, accepted by Alfred Mellor, and not answered, was, at his request, continued for 1867.

QUERY 24. On Scutellaria, was continued to G. F. H. Markoe for 1867.

QUERY 25. On Benzinating Lard and its use in certain ointments, accepted by M. Doliber, of Boston, was read by Mr. Markoe. This paper attracted considerable interest. Mr. Markoe stated that lard or cerate had been prepared by the formula given by Mr. Doliber and sent out in a voyage to the coast of Africa in a medicine chest, and on its return was uninjured by oxidation, and fit for use.

QUERY 26. On Beeswax. Was, at the request of Mr. Babcock, by whom it was accepted, continued for another year.

QUERY 27. By Prof. Wadgymar, was not replied to, probably for the reason that all the St. Louis and Cincinnati members were detained by cholera.

QUERY 28. On Apparatus for forming pills of uniform size and rapidly on a moderate scale, accepted by F. Bringham, not replied to.

QUERY 29. In reference to Coating Pills, not replied to by S. Mason McCollin.

QUERY 30. On *Liquor Ammoniae Acetatis*, referred to Dr. W. H. Pile, of Philada., was answered in a paper by that gentleman, read by Prof. Procter. This paper called forth considerable discussion in reference to the several modes of procedure adopted by apothecaries in different localities for making spirit of *Mindererus*.

The President now announced that samples of various wines and pharmaceutic preparations would be on exhibition in the anteroom after the adjournment of this session.

The meeting then adjourned till 2½ o'clock, P. M.

*Third Session.—Aug. 23. Afternoon.*

The President called the meeting to order at 2½ P. M.

The minutes of the preceding meeting were read and adopted.

The Executive Committee proposed the following names for members:—Emanuel Mann, Ann Arbor, Mich.; Noah Huckins, Jackson, Mich.; Daniel W. Richardson, Almont, Mich.; J. E. d'Avignon, Montreal, Canada East.

The President appointed E. T. Ellis and G. W. Eldridge as tellers, who reported the several candidates as unanimously elected.

The Report of the Special Committee on the Internal Revenue Law in its relation to the trade, being next in order, Dr. E. R. Squibb, the Chairman, read it at great length. The report, which occupied nearly 100 pages of cap paper, exhibits the bearing and effect of a high rate of taxation and duty upon alcoholic spirits used in the manufacture and preparation of drugs and medicines, and the working of the stamp tax in relation to regular and irregular preparations, etc. Inasmuch as the opinions of some members of the committee differed from that of the Chairman, the report embraces the opinions of all the members, and the correspondence with the Commissioners of Internal Revenue.

A resolution of thanks to the Commissioners for the kindness and attention with which the representations of the Committee were received, was appended to the Report.

On motion, the Report was accepted and the resolution unanimously adopted.



Prof. Parrish thought the Report should be published entire, and the intelligent pharmacist have the benefit of those portions where the provisions of the law are carefully arranged and systematized. He thought, however, that that portion of the law relating to the stamp taxes had been made worse instead of better, but he was not disposed to quarrel with the Committee, who had arrived at so much and done so well.

After some discussion on the meaning and intent of the law in reference to text books, formularies, etc., which render preparations exempt when they contain the formula for them, the Association, on motion of Mr. Brown, of Kansas, passed a vote of thanks to the Chairman and members of the Committee for their able report.

The Treasurer, Charles A. Tufts, of Dover, N. H., now read his report, which was in detail, and suggestive of reform in the management of his department. The receipts during the year have been \$2,295.74, and the disbursements \$1,678.16; leaving a balance in the treasury of \$617.58.

The report was accepted and referred to H. W. Lincoln, of Boston, C. A. Heinitsh, of Lancaster, Pa., and William Saunders, of London, Canada West, for auditing.

A letter from Henry F. Fish, of New York, enclosing five dollars, was read. On motion the letter was placed on file, the money in the treasury, and the Secretary directed to tender a resolution of thanks of the Association to the writer.

QUERY 31. In reference to the exclusion of Actinic Light from Depositories of Drugs, offered for general acceptance, was not replied to. Dr. Jenkins, of Louisville, remarked that in protecting drugs it should be borne in mind that the actinic rays were essential to health, and should not be excluded from the shop where the apothecary operates, though very properly from his cases and closets.

QUERY 32. Relative to Testing Fluid Extracts, referred to Prof. E. Parrish, was not replied to, and at his request was dismissed from the list.

QUERY 33. Relative to Gillenia Trifoliata, referred to Mr. Ebert, was verbally answered by Mr. Ebert, who gave as the reasons for not producing a paper, the difficulty of procuring

reliable samples of the drug. He had operated on one of these, and obtained results so wide of his expectations that he felt almost certain the root obtained was not genuine.

QUERY 34. On Citric Acid in the Tomato, was not replied to by Mr. Rittenhouse, to whom it had been referred.

QUERY 35. Relative to Valerian grown in New England, was replied to by a paper from Thomas Doliber, of Boston, illustrated by specimens, in which he took the ground that Vermont valerian was even better than much of the article reaching this country under the name of English valerian.

Dr. Squibb thought the best German valerian equal to any, and better than what he had seen of that produced here. He believed that inferior drugs often were sent here because those ordering them limited the price.

Dr. Duffield said that there was a fluid extract called American valerian, which was really made from the *Cypripedium*, or Ladies' Slipper, and he suggested the impropriety of the name as causing confusion. Others had met with the same difficulty.

QUERY 36. Relative to Fermentation and Cryptogamic Vegetation, viewed as Destructive Agents in connection with Drugs. Mr. Procter stated that Mr. Scattergood, to whom that query was referred, yet continued his observations in the direction of the query, but that he was not prepared yet to produce any results. He therefore wishes that the query be discontinued, leaving it for him to report when his observations are matured, which was granted. Dr. Jenkins remarked that he had arrested fermentation by the use of sulphite of soda, and had thus prevented cryptogamic growth in medicinal solutions.

QUERIES 37 and 38 were not replied to by Profs. Mayer and Bedford.

Prof. Maisch read a paper by Mr. Neynaber, of Philada., on a new still and cooking apparatus, illustrated by a copper model, with gum joints and clamps arranged so as to be automatic to a certain extent as regards the pressure of the steam. As the apparatus is patented, a motion by Dr. Garrigues to refer it to the Committee for publication was lost. Dr. Squibb, of the Business Committee, moved that the thanks of the Association are due to the author of the paper, who is the patentee of the

apparatus, for its exhibition to them, but that the Association declines publishing and figuring it, from an unwillingness to establish a precedent for publishing notices of patented articles which may be offered by the patentee.

The resolution was affirmed.

The Business Committee proposed several amendments to the Constitution, to lay over till the next session.

The Association then adjourned till 9 o'clock, to-morrow morning.

*Fourth Session—Friday Morning. August 24th.*

The Association convened at 9 o'clock, the President in the Chair. The minutes were read, corrected, and adopted.

The proposed amendments to the Constitution being in order, that brought forward by the Business Committee at the first session, relative to signing the certificate of membership, was taken up.

Prof. Parrish moved an amendment, when after considerable discussion the whole subject was laid on the table.

The following Resolution from the Business Committee was now read, discussed, and adopted, viz :

*Resolved*, That Article II. of the Constitution be amended by the introduction of a new Section, to be called Section V., as follows :

Resignation of membership shall be made in writing to the permanent Secretary or Treasurer. But no resignation shall be accepted from members who are in arrears to the Treasurer. All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported at the next annual meeting.

*Resolved*, That the present Section V. shall be called Section VI.

The Business Committee brought forward a series of amendments arising out of the President's address, the first being to render the office of Treasurer permanent, with a salary attached, as in that of the Permanent Secretary. After discussion, this amendment was lost, leaving the matter as it was.

Mr. Lambert, of Lambert & Kamping, wine merchants of New York, here by permission, introduced and exhibited varieties of their Hygienic and Muscat perle wines, designed for medical purposes.

Mr. O. M. Tinkham, agent of Perkins, Sterne & Co., Broad-

way, N. Y., also exhibited samples of California port, hock, claret and Angelique wines as well as a sample of California brandy. The speaker described the kind of grape as an Andalusian variety, introduced into California 100 years ago, by the Missionaries. He also described the manner of making the wines. Hock is made from grapes just ripe, Port next, followed by the Angelique; lastly, the dry wine and brandy from the residue. The hurried manner in which the subject was necessarily treated, precluded an introduction of details.

Tourtelot Brothers, of Chicago, submitted specimens of their essence of beef, which is prepared in the same manner as condensed milk, coffee, etc., *in vacuo*—one pound of the essence containing the nutriment of 20 pounds of beef. It is used for soup, beef-tea, etc., and great excellence is claimed for it.

The following resolution of amendment, brought forward by the business committee, was discussed and adopted:

“Resolved, That Article II., Section 3d, be amended so as to read as follows:

“No person shall be considered a member of this Association until he shall have signed the constitution and paid into the treasury the sum of three dollars, as an initiation fee, and the annual contribution for the year.”

Another resolution, moved and carried, makes it the duty of all who apply for membership in the Association to see that their names are correctly and plainly written, and their post-office address correctly given. The Association hereafter will not be responsible for mistakes in the certificates, or in the roll of members, which occur through want of care in forwarding full names and changes of address; nor will the Association hereafter replace volumes of proceedings lost through change of residence, of which the Secretary shall not have been duly notified.

Another resolution, in regard to the arrearages of southern members, was adopted as follows:

*Resolved*, That all members of the Association who may have been prevented from sharing in its benefits by the war, shall have their dues remitted, and may retain their membership unimpaired by resuming the payment of their annual contributions with the present year, such members to be furnished with the past volumes of Proceedings, if they desire them, at the prices fixed by the Executive Committee.

*Provided*, all such members shall have notified the Secretary or Treasurer of their desire to retain their membership, *before* the next annual meeting.

Resolutions regarding an act of incorporation and a certificate of life membership were withdrawn.

It was also resolved, that a list be appended to the Proceedings with the following caption :

"List of societies, libraries, journals and individuals, to whom complimentary copies of the Proceedings of this Association are to be annually forwarded by the Permanent Secretary. "And that this list be called up for additions and amendments in the regular order of business at each annual meeting.

Dr. T. R. Spence, of Detroit, urged the appointment of a Committee of practical pharmacutists to examine further into the subject of the Revenue Law, and offered the following resolution, which was finally adopted :

*Resolved*, That a Committee of three be appointed to take into consideration the whole subject of the Internal Revenue Law, as it relates to the interests of the drug trade and of Pharmacy, and to report thereon at the meeting next year, and that the President of the Association shall be Chairman of this Committee.

On motion of Dr. Squibb, the President was authorized to appoint that Committee at his leisure.

The Committee appointed to examine the Treasurer's account reported that they had attended to the duty, and found his accounts correct.

The report was accepted and adopted.

The Committee on Specimens offered the following report :

The collection of Pharmaceutical and Chemical Specimens exhibited are not as numerous as on former years.

Mr. F. Stearns, Detroit, Michigan, exhibits Pharmaceutical preparations, powdered drugs, perfumery, etc., exhibiting his well known skill and enterprise.

Henry W. Lincoln, of Boston, Ferro brom, Bismuth, Chlorate of Potash, and Cachon Tablets.

Howell & Onderdonk, of New York, offer Syrup of Iodide of Starch, Elixir of Calisaya, Iron and Bismuth, Elixir of Valerianate of Ammonia and Quinine, and Liquor Bismuthi.

Robert R. Kent, East Boston, Metallic nipple shield and caoutchouc teat.

Tourtlot Brothers, Chicago, Essence of Beef, one lbj. representing 20 pounds of beef.

Thomas Daniels, Toledo, Ohio, drawings of his cooler and draught tube for soda water.

A. F. Neynaber, Philadelphia, a model of a steam distilling apparatus.

Perkins, Sternes & Co., California, native wines, consisting of Angelica, Claret, Hock, Port and Mustacel; also, grape brandy, which are, in the opinion of your Committee, equal to any wines now offered for medicinal purposes.

E. C. Roberts, Salem, Michigan, a native port wine one year old.

Charles A. Heinitch, of Lancaster, Penna., Saffron corms and stigmas, grown in Lancaster county, Pa. Respectfully submitted.

CHARLES A. HEINITSH,	} Committee.
J. W. DIETRICH,	
H. A. BLAUW.	

A motion of the Business Committee, that the salary of the Secretary be the same as for last year, was carried.

The letter from the Austrian Apothecaries' Association being called up for consideration—

The Secretary stated that the second portion of the letter, relating to exchanges of publications, had been attended to without his knowledge of their wishes.

Prof. Procter moved that so much of the letter as relates to specimens of tropical fruits be referred to the College of Pharmacy of the city of New York, asking their attention to it if admissible, which was agreed to.

Mr. Markoe moved that when the Association finally adjourns, it adjourns to meet in New York next year. Carried.

Mr. Brown, of Kansas, moved that the time be fixed for the second Wednesday of September, 1867. .

Mr. Sackrider, of Cleveland, moved to amend this by substituting Tuesday for Wednesday, which was carried.

The question on the resolution as amended, that the next meeting be held in New York, on the second Tuesday of September, 1867, was then affirmed.

The Business Committee moved that the Treasurer be authorized to pay to the Janitor such sum for his services as the Detroit members consider just.

The Detroit members objected and the subject was dropped.

Prof. Parrish offered the following resolution, which was adopted:—

*Resolved*, That the President and Permanent Secretary are instructed to accredit any suitable delegates to the International Pharmaceutical Congress, at Paris, 1867, if, on inquiry, any members of this Association can be induced to represent us in that body.

The report on Scientific Queries being again called up, Prof. Procter said the queries for 1867, with the names of the members accepting them, were as follows :—

QUERY 1st.—Conia has been recommended as a therapeutic agent, but it is liable to alteration from atmospheric oxygen. As the salts of conia appear to be permanent, and are odorless, why may not some of these be substituted for the alkaloid?

*Accepted by George C. Close, of Brooklyn, N. Y.*

QUERY 2d.—To what constituent or constituents does Cubeba owe its diuretic power, and what relation does cubebin hold to the soft resin and volatile oil in the therapeutic action of the drug.

*Accepted by F. V. Heydenreich, of Brooklyn, N. Y.*

QUERY 3d.—Do the leaves of *Digitalis purpurea* grown in the United States yield less digitalin than the European plant; and is the alleged inferiority of the former, if this be true, due to a deficiency of this principle?

*Accepted by Samuel P. Duffield, Ph. D., Detroit.*

QUERY 4th.—Is there a dry wine, made from grapes within the United States, suitable for medicinal use, and what is its name and strength.

*Accepted by Frederick Stearns, of Detroit.*

QUERY 5th.—Diluted Hydrocyanic, U. S. P., sometimes spontaneously decomposes into paracyanogen and other products, acquiring a black color, which M. Millon attributes to the action of ammonia. Will the presence of a minute portion of  $\text{SO}^3$ ,  $\text{HO}$  obviate this, as has been asserted, and when the change has commenced will this addition suspend it?

*Accepted by Dr. Edward R. Squibb, Brooklyn, N. Y.*

QUERY 6th.—Is the direction, in the formula for compound decoction of Sarsaparilla, U. S. P., to macerate the ingredients in cold water for twelve hours previous to ebullition sufficiently important to justify the delay it occasions, and will not digestion at  $200^{\circ}$  F. for two hours be a judicious alteration.

*Accepted by William Saunders, London, Canada West.*

QUERY 7th.—It has been asserted that Yellow Wax is better than bleached wax for the preparation of Ceratum and Unguentum Adipis. If this be true, what principle in the crude wax possesses this property, and for what extent of time may its conservative power be relied upon.

*Referred to Ferris Bringham, of Wilmington, Del.*

QUERY 8th.—For some years past, commercial Honey has frequently been a subject of adulteration. What is the present state of the trade in this article, foreign and domestic, and what are the adulterations used?

*Accepted by Ferris W. Colby, New York.*

QUERY 9th.—Syrup of Senega is sometimes cloudy and semi-gelatinous in consistence, even when the officinal directions are followed, due probably to pectin. How may this be uniformly avoided in practice.

*Accepted by C. Louis Diehl, of Louisville, Ky.*

QUERY 10th.—The past and present history of the turpentine trade, including the production of turpentine and the distillation of its oil, in the United States?

*Accepted by J. M. Holland, Jackson, Mich.*

QUERY 11th.—Many volatile oils rapidly deteriorate by atmospheric oxidation and become commercially worthless. How far is it possible to restore these by redistillation or other means to their original condition, and does the oxygenation affect the whole mass or a part only?

*Accepted by T. B. Dorsey, Dresden, Ohio.*

QUERY 12.—What is the best method of preserving Lemon Juice so as to retain its good flavor and appearance during that part of the year when lemons are scarce?

*Accepted by Henry Sweet, of Chicago.*

QUERY 13th.—Oleum Theobroma; an essay on this fat as regards its manufacture, adulterations, uses and commercial history.

*Accepted by Henry W. Lincoln, Boston, Mass.*

QUERY 14th.—Extract of Hemlock Bark, (*Abies Canadensis*); what is its composition, what variety of tannic acid does it contain, how made, and what are its merits as a medicinal astringent compared with Kino, Catechu and Krameria?

*Accepted by William Procter, Jr., Philada.*

QUERY 15th.—The experiments of Charles Bullock render it very doubtful whether Veratria exists in *Veratrum Viride*, as has been stated; but that two well-marked alkaloids having different properties replace it. Can the second or resin-like alkaloids of Mr. Bullock be obtained in a purer and better defined form, is the sedative power of the drug chiefly due to it, and what relation does the other alkaloid bear to Veratria?

*Referred by the Association to Charles Bullock, of Philada.*

QUERY 16.—Can the existing pharmaceutical preparations of Ergot be improved if studied in the light offered by W. T. Wenzell (see *Amer. Jour. Pharm.*, vol. xxxvi. p. 193), and can a permanent solid preparation of Ergot be made representing its alkaloids in a concentrated form?

*Accepted by Jas. W. Mill, Chicago, Ill.*

QUERY 17.—Is not the present formula for Tincture of Chloride of Iron obnoxious to criticism as regards the permanence of its product?

*Referred to E. Heydenreich, Brooklyn, N. Y.*

QUERY 18.—Can any improvement be suggested in *Syrupus Lactucarii* U. S. P. 1860?

*Accepted by Albert E. Ebert, Chicago, Ill.*

QUERY 19.—A process for isolating Aloin in a crystalline state, which



shall be practical and economical, by which the whole of the Aloin in aloes may be rendered available.

*Accepted by Wm. Procter, Jr., Philadelphia, Pa.*

QUERY 20.—Does the Colchicia of John E. Carter (*Amer. Jour. Phar.* vol. xxx. 208) exist in the seeds of *Colchicum autumnale*, and can it be isolated from either source for use in medicine with advantage?

*Accepted by C. Lewis Diehl, of Louisville, Ky.*

QUERY 21.—The seeds of *Ricinus communis* are much more purgative in their effects than the expressed oil. To what principle does this power belong, and what relation does it bear to the alkaloid Ricinin of Prof. Tusson?

*Referred to Prof. Wadlymar, of St. Louis, Mo.*

QUERY 22.—What are the physiological properties of the leaves of *Ricinus communis*, and what constituent renders them active?

*Accepted by F. V. Heydenreich, of Brooklyn, N. Y.*

QUERY 23.—The leaves of *Podophyllum peltatum* are said to be poisonous (*U. S. Disp.*) Is this true? Are they cathartic, and to what principle is their activity due?

*Accepted by Saml. P. Duffield, Ph. D., of Detroit, Mich.*

QUERY 24.—What kinds of Tar were used as substitutes for Carolina Tar during the late war; and from what, how, and where prepared?

*Accepted by Saml. S. Garrigues, of East Saginaw, Mich.*

QUERY 25.—Is the *Sennin* of Robert Rau (see *Amer. Jour. Pharm.*, May, 1866, p. 193) the true active principle of Senna, or must its cathartic power be attributed to another principle?

*Accepted by Robt. C. Kennedy, of Cleveland, Ohio.*

QUERY 26.—It is alleged by Mr. George Johnson (*Pharm. Jour.*, Oct., 1865, p. 179) that the deposit in wine of *Ipecac* contains an appreciable quantity of Emetia in an insoluble state, contrary to the experiments of Mr. Roberts (see *Proc. Amer. Pharm. Assoc.*, 1859, p. 281). Is this true, and how can it be demonstrated?

*Accepted by G. F. H. Markoe, of Boston, Mass.*

QUERY 27.—Does the precipitate characteristic of the tincture and vinegar of *Sanguinaria* contain any of its alkaloid; and if so, how demonstrated, and what percentage?

*Accepted by Josiah B. Frost, of Ypsilanti, Mich.*

QUERY 28.—Does the insoluble matter filtered from Fluid Extract of *Veratrum viride*, in the process of the U. S. Pharmacopœia, contain any of the sedative resin-like alkaloid of Charles Bullock; and if so, how may the process be modified to prevent its loss?

*Accepted by Alfred Mellor, of Philadelphia, Pa.*

QUERY 29.—May not *Extractum Conii* and *Extractum Conii Alcoholicum* U. S. P. be rendered more permanent and stronger by the addition of an acid before evaporation,—as the acetic or sulphuric?

*Accepted by Edward C. Jones, of Philadelphia, Pa.*

QUERY 30.—What is the best formula for medicinal Digitalin, suited for adoption in the U. S. Pharmacopœia?

*Accepted by Wm. Procter, Jr., of Philadelphia, Pa.*

QUERY 31.—Those astringents containing Tannic Acid of the type Kino and Krameria, producing green tannates of iron, lose their astringency when kept in liquid form. What is the rationale of this phenomenon, and what relation does it bear to the gallic fermentation?

*For general acceptance.*

QUERY 32.—Does Sulphite of Quinia exist? Is it a permanent salt? and if so, has it any merit as a therapeutic agent independent of its basic ingredient?

*Accepted by Dr. Thos. E. Jenkins, of Louisville, Ky.*

QUERY 33.—Is there a method by which the Cinchotannic Acid in the preparations of Cinchona Bark may be removed, so that the full influence of the native Kinates may be obtained in connection with iron or otherwise without any inky coloration, and without disengaging the alkaloids or causing their loss?

*Accepted by N. Gray Bartlett, of Chicago, Ill.*

QUERY 34.—How may the pharmacist best obtain the facilities for physical exercise, social enjoyment, and intellectual culture, which are so essential to success in every pursuit?

*Accepted by Prof. Edward Parrish, of Philadelphia, Pa.*

QUERY 35.—Can the officinal salt Ferri et Potassæ tartras be uniformly produced by the Pharmacopœia process? What is its composition? What are the residues of the process, and can the process be improved?

*Accepted by Jas. F. Babcock, of Boston, Mass.*

The report was adopted, and referred for publication.

Dr. Jenkins, of Louisville, here offered some verbal remarks on Sulphite of Quinia, which he had taken as a subject for investigation.

Prof. Israel J. Grahame's paper on the Virginia Opium, given in charge to him last year for investigation, was now called up, and read by Prof. Procter. It was referred for publication.

The results of Prof. Graham exhibit only about  $\frac{1}{4}$  per cent. of morphia, and 3.5 per cent. of narcotina.

Dr. Squibb considered the quantity operated on too small to give reliable results by the process adopted.

The Executive Committee brought forward the names of Henry Griffin, of Grand Haven, Mich., and William Maurice Moore, of London, Canada West, for membership. Messrs. Ebert and Brown were appointed tellers, and, after a ballot was effected, reported their unanimous election.

Prof. Procter read a paper from James T. King, of Middletown; Orange Co., N. Y., on metallic lead in flour, which was referred for publication.

Mr. Markoe, of Boston, read a paper on Liquor Bismuthi, which was referred for publication.

A paper on Iodide of Ammonium, from James F. Babcock, of Boston, was read by the same gentleman.

Charles A. Heinitsh, of Lancaster, Pa., read a paper on the culture of true Saffron in Lancaster County, Pa., and presented a number of bulbs of the plant and a specimen of the stigmas.

Dr. S. S. Garrigues, of East Saginaw, Mich., read a paper upon the Bromine in the salt brine of that place, which was deemed to be in sufficient amount to pay for its extraction.

Dr. Squibb hoped the writer would pursue his researches further, as the general use and great demand for Bromine render any source of production of much importance.

All these volunteer papers were referred to the Executive Committee for publication in the Proceedings.

The Association then adjourned till 7 o'clock, P. M., in order to accept an invitation from the druggists and pharmacutists of Detroit for an excursion on the Detroit river to Lake Erie and return.

[We have made no attempt to give an abstract of the regular or volunteer papers presented to the Association, as we hope to print many of them after the Proceedings appear, and it has been deemed improper to anticipate the Proceedings,—an occurrence due several times to the tardiness of their publication.—  
ED. AM. JOUR. PHARM.]

*Fifth Session.—Friday Evening. August 24th.*

The meeting was called to order by the President at 6½ P. M., the minutes of the preceding session being dispensed with. [The Association convened immediately after their return from a delightful excursion on the river in the steamer Morning Star, a large and commodious vessel, every way calculated for comfort and pleasure. The company consisted of the visiting members and their ladies and the Detroit members and their ladies, all forming a company of about 200, with music and other etceteras.

The trip extended to Lake Erie, affording an excellent view of the villages, country seats, manufactories, and scenery generally of this outlet of the great northern lakes.—EDITOR AM. JOUR. PHARM.]

Prof. Edward Parrish read a paper on Titles, which on motion was accepted and referred for publication.

Dr. Duffield, of Detroit, read an important paper on the influence of hypodermic injection in toxicology, showing the difficulty if not impossibility of detecting poisonous alkaloids after they are introduced into the circulation in that way.

Some discussion ensued, and the importance of keeping this knowledge from popular journals was insisted on.

Prof. J. M. Maisch read a paper on the assaying of Sherry wine, and another on brandy and whiskey.

The same writer read a paper on the specific gravity of chloroform, and another on the statistics of the U. S. Army Laboratory at Philadelphia.

Mr. C. Lewis Diehl read a paper entitled Remarks on some Chemical Processes.

All these papers were accepted and referred to the Executive Committee for publication.

Prof. Procter exhibited a Chinese prescription, written on Chinese paper, and the original package of medicine it called for, put up in San Francisco by a Chinese doctor. The same member exhibited a dried specimen of the leaves of the so-called "vanilla plant" of North Carolina, *Liatris odoratissima*, which he had on a former occasion shown to owe its odor to coumarin, as in tonka bean. The leaves are used in Carolina to preserve clothes from moths.

Mr. A. B. Spencer, of Rochester, exhibited a beautiful and elaborately finished atmospheric filter for condensing fluids and extracts. It is a more complete arrangement than the one exhibited and figured last year, and may be used for distillation in vacuo as well as for filtering. Mr. Spencer had been at great expense in getting up the apparatus, which he had not patented, and had come specially to exhibit it to the Association. A vote of thanks was tendered the author and contriver, and his apparatus directed to be figured in the proceedings.

The Business Committee then brought forward the following Resolutions, viz :

*Resolved*, That the Secretary be directed to address a vote of thanks from the Association to the Judges of the Supreme Court, for the use of this room, which has been occupied by the Association only through their courtesy and liberality.

Unanimously passed.

*Resolved*, That the thanks of the Association are eminently due, and are hereby heartily tendered to the druggists and pharmacutists of Detroit, for their judicious and liberal care of the Association, and for their kind and considerate hospitality to the members and their families during their visit to Detroit.

This resolution was adopted with emphasis by the visiting members, whose sense of its truthfulness gave force to their expression.

A resolution was then moved and adopted unanimously, thanking the corps of reporters for the daily papers, for their assiduous attention and efficient reports of the sessions.

The minutes of the day's sessions were then read and affirmed, and the Association adjourned finally, to meet in New York on the second Tuesday of September, 1867.

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“EXTRACTUM CINCHONÆ FLUIDUM.”

By JOHN T. WALKER.

The officinal fluid extract of Cinchona being a turbid preparation, not capable of holding the cincho-tannates in solution without occasional agitation, I tried a new process with apparent success. In making a pint of fluid extract the following method was adopted : Eight troyounces of the bark in moderately fine powder were taken, and subjected to percolation. The first twelve fluidounces were reserved, and percolation continued until the bark was thoroughly exhausted ; the menstruum being diluted alcohol.

The liquid last displaced was mixed with six fluidounces of syrup and four fluidounces of pure Glycerin, and evaporated to about twelve fluidounces. The reserved portion was then added and the whole reduced to sixteen fluidounces. No straining was necessary, as the fluid extract was perfectly clear and of a beautiful red color.

JOHN T. WALKER.

PHILADELPHIA, Aug., 1866.

*Tratado de Farmacia y Farmacognosia por Carlos Murray, Profesor de Farmacia y Farmacognosia en la Facultad de Medicina, Presidente y Ex-Secretario General de la Sociedad de Farmacia Argentina, miembro de la Sociedad Quimica de Paris, etc. etc. Royal octavo, pp. 679, Buenos Ayres, 1866.*

This work makes its appearance in consequence of a want felt by Prof. Murray, upon assuming the newly created chair of Professor of Pharmacology in the Faculty of Medicine in Buenos Ayres, of a treatise in the Spanish language, which might serve as a text-book for the students on the general principles of Pharmacy, and should also treat particularly of the drugs and preparations in common use in the Argentine Republic. In the first two divisions of the work, occupying about sixty pages, the compounding of prescriptions, weights and measures, (in which we notice that the metrical system is permissive in that country), specific gravity, the administration of medicines, &c., are briefly considered, together with the various operations of solution, maceration, evaporation, distillation, &c. The main body of the work is taken up with an account of the medicinal agents usually employed, which, from the fact that nearly all the civilized nations are represented among the physicians and pharmacutists of the country, are numerous. Among the articles of the *Materia Medica*, we observe our own *Podophyllum*, Wild Cherry Bark and Senega Root, and also some with which we are not familiar which are indigenous to that country—as the *Erythraea chilensis*, employed as a tonic, the *Acacia Paraguayensis*, the fruit of which forms a good substitute for galls, containing, according to Parody, 39 per cent. of tannin (*Revista Pharm.*, 1864) and *Sambucus nigra*, the inner bark of which is used as a hydrogogue cathartic. Among other plants of the country, the *Arnica montana*, *Guaiacum officinale* and *Conium maculatum* are said to be common, and the *Digitalis purpurea*, *Atropa belladonna*, *Punica granatum*, *Plantago major*, *Taraxacum leontodon* and *Datura stramonium* are to be met with.

The valuable productions of other portions of the South American continent appear to hold as high a place in public estimation in Buenos Ayres as they do here, and we notice the

names of some others apparently still in use : Elemi, Extract of Monesia and Bebeeru, which hold probably a higher place.

Several indigenous species of *Cantharis* are alluded to as probably fully equal to the European varieties, particularly the *C. femoralis*, of Chili, which has been examined by Quevedo. Those native to the Argentine Republic have been named by Burmeister, *C. adspersa*, *punctata*, *vittigera* and *viridipennis*.

Guarana, a preparation of the fruit of *Paullinia sorbilis*, in which Dr. Stenhouse found the large amount of five per cent. of caffen, is said to be employed in Brazil as a tonic and remedy for diarrhoea ; and the *Ilex Paraguayensis*, from which the *yerba mate*, or Paraguay tea is derived ; and the *Erythroxylon coca*, of Peru, are also mentioned ; the latter appears to be somewhat employed in dyspepsia, gastralgia, &c., though its virtues are said to be still on trial.

The substances alluded to are briefly described with relation to their commercial history and varieties, chemical properties and pharmaceutical preparations, but we miss a fuller account of their therapeutical uses and effects. In the absence of a National Pharmacopœia as a basis, all the substances are arranged under the two great divisions of Inorganic and Organic Pharmacy, under which they are again subdivided into smaller groups—in the former with reference to the elementary bodies from which they are derived, and in the latter into the families of starches, sugars, resins, essential oils, &c., according to the character of their essential constituents, the plan employed by Soubeiran, and which has its advantages in a pharmaceutical point of view, whatever may be thought of it as a strictly scientific classification.

We are glad to see this further substantial evidence of increased attention to the interests of Pharmacy in the Argentine Republic, and trust it will do much to promote the more accurate study of the indigenous drugs, and the development of the resources of that great continent, which, in its cinchona, ipecac and other productions, has made already such valuable contributions to our list of medicinal agents.

The typographical execution and general appearance of the work are very creditable to the publishers.

S.

## PERUVIAN CINCHONAS.

We have been favored with the following letter for publication relating to the Cinchona :—

“I was glad to see from your letter that the seeds had turned out a success. I was in Peru during some three years, in daily contact with the Cascarilleros (as the quinine bark collectors are called) of both Peru and Bolivia. I always found the Cascarilleros ready to assist in anything I wanted. I went with them on their bark-hunting expedition far into the interior, and made a collection of plants, leaves, etc., to bring home to Europe, which, however, were all lost in the siege at La Paz, in 1863, when our house was completely sacked, being close to the part of the town entered by the besiegers. I only saved the bag of seeds, which, luckily, was in my portmanteau with clothes, and which, fortunately, are from the district considered as the finest Cascarilla of Bolivia; the bark from that part (the head-waters of the river Beni) fetching a far higher price than any other in South America, at least so the best China bark merchants assure me.

“As I had not sufficient knowledge of the trees myself, for there are various species of this tree growing everywhere, I trusted to some Indian cascarilleros whom I knew, and think they did not deceive me when they assured me that this was the finest sort; the seeds were collected in 1861, in the forests on the east side of the river Massiri, in the province of Laricaja, lat.  $14\frac{1}{2}^{\circ}$  S., long.  $70\frac{1}{2}^{\circ}$  W. The Massiri is a tributary of the Beni, a principal branch of the Madera arm of the Amazon, and inhabited by the Takana Indians, from whom I received much kindness. They live exclusively along the river, their principal food being fish and monkeys, though some of the nearer ones, as at Huanay, have maize and sugar-cane. Cotton, both white and nankeen, grows everywhere in abundance, wild, as a perennial shrub or tree; quality excellent, and nearly equal to Sea Island, as I have had them tested in Manchester. They are very clever in making woven articles of this cotton.

“The bark tree is not found along the rivers, but at from 1000 to 4000 feet higher up, either in single trees or small



clumps amongst the other trees, easily recognizable by the particular green color of the leaves, and the Cascarilleros find out the trees by ascending lofty trees or hills, and paying attention to this fact, otherwise the undergrowth of these immense virgin forests would render it impossible to find them. I, with others to assist me, have been half a day cutting a way to one of these clumps. The climate is everywhere intensely hot and moist, and the fevers deadly, especially in the rainy season; the mortality, as may be expected, very great. All the rivers abound in gold, I believe as rich as California. A friend of mine, Don Laurento Villamel, took 1200 oz. of gold ( $23\frac{1}{2}$  carat) out of about an area of 30 feet square on the river bed.

“I always was in excellent health, which I attribute to being always at work on foot, hunting, or pounding the rocks with a hammer. Still I often took three grains of sulphate of quinine in the morning.—*David Forbes*.” [We learn from Mr. Howard, the eminent quinologist, that a plant reared from one of the seeds above alluded to proves to be a new and probably valuable kind of Calisaya—the “verde,” of which an account was given in Mr. Howard’s important communication of the Cinchona barks read at the recent Botanical Congress.\* Eds.]—*Lond. Pharm. Journ.*, August, 1866, from *Gardeners’ Chronicle*.

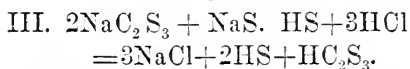
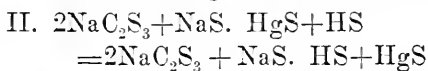
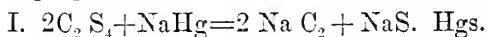
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#### ON A NEW SULPHIDE OF CARBON.

Low, a German chemist, has described a new sulphide of carbon obtained by the action of an amalgam of sodium upon the bisulphide. When semi-fluid amalgam of sodium is shaken with bisulphide of carbon in a well-corked bottle, the temperature of the mixture rises, and the process is complete, when after repeated addition of the bisulphide heat is no longer evolved. If the mixture be then thrown into water, a blood-red solution is formed, which, after filtering, contains much mercury; by passing sulphuretted hydrogen for some time into the solution, this may be removed. The dark-red solution is then to be poured into dilute chlorhydric acid with constant stirring. A flocky red

\* See *Pharmaceutical Journal* for July, p. 14.—ED. PH. J.

substance is separated which aggregates to a rough resin, while much sulphuretted hydrogen is given off. The resinous mass is to be washed continuously with hot water as long as it smells of sulphuretted hydrogen. On cooling it becomes brittle, and then yields a violet-brown glistening powder which may be purified by solution in bisulphid of carbon, filtration and evaporation. The new sulphid is but slightly soluble in alcohol and ether, but is readily soluble in bisulphide of carbon with a red color. It dissolves in the pure alkalis, as well as their carbonates, with partial decomposition, but appears to be taken up by alkaline sulphides without alteration. Concentrated sulphuric acid dissolves it with a red color, and water precipitates it from this solution. Nitric acid of 1.5 attacks it violently and appears to form a new acid. Heated in a closed tube to  $100^{\circ}$ , the new sulphide melts to a tough resin, and remains in this state after the temperature rises to  $150^{\circ}$ . Sulphuretted hydrogen is then given off. At  $200^{\circ}$  an amorphous yellow body sublimes, and on further heating much voluminous carbon remains. Analysis gave for the new body the formula  $C_2S_3$  H. The author explains its formation by the following equations.



Low regards the body  $C_2S_3$  as a radical analogous to cyanogen or methyl. The compounds of this radical with the alkaline metals are dark red to black and easily soluble in water; those with the heavy metals are brown or black precipitates.—*Druggists' Circular*, June, 1866, from *Wittstein's Vierteljahresbericht*, 1865, vol. 14, p. 483.

## OBSERVATIONS ON THE PRESENT STATE OF OUR KNOWLEDGE OF THE GENUS CINCHONA.

BY JOHN ELIOT HOWARD, F.L.S.

(Abstract of a Paper read at a Meeting of the International Botanical Congress, and prepared by the Author, by desire, for the Pharmaceutical Journal.)

The writer approaches the consideration of the Cinchonaceous plants rather more from a practical than from a technically botanical point of view, and thinks that much remains yet to be done by careful study of the plants themselves, to reduce Botanical terms to harmony with Pharmaceutic requisitions, and thus to discriminate between forms which, in a therapeutic point of view, produce wholly different products, and which have been thrown together by systematic arrangement founded on insufficient data. The *C. micrantha* of Huanuco, for instance, produces a "grey bark," characterized by its abundant yield of pure cinchonine; whilst the *C. micrantha* of Bolivia differs widely in its chemical contents, and presents apparently a somewhat differing form. Again, the *C. ovata* of Pavon and of Peru, gives an entirely worthless bark producing aricine (or paracin), whilst the *C. ovata*, var. *rufinervis*, Wedd., of Bolivia, is a plant allied to the Calisaya in its products, and the *C. ovata*, var. *erythroderma*, approaches to, and is not improbably found amongst the red-bark-producing plants.

Mr. Howard does not propose to found a diagnosis of species, either on the chemical constituents of the barks, or on their microscopical constitution, but to follow out more fully, and to a greater extent, the consideration of the barks as assisting in the discrimination of species and varieties, according to the precedent so ably established by Dr. Weddell in his admirable "Histoire des Quinquinas."

Mr. Howard is nearly in accordance with Dr. Weddell and with M. Gustave Planchon (whose recently published work\* he regards as the most valuable *manual* that has yet appeared on the subject), in regarding "Cinchona as forming a very natural genus, the different forms of which often pass from one into another by insensible transitions," but leaving it open for fur-

\* "Des Quinquinas," par Gustave Planchon; Savy, Paris, 1864.

ther investigation whether there may not, as stated by Dr. Karsten, be a subgenus, forming a point of transition between *Cinchona* and *Ladenbergia*. However this point may be decided by botanists, the writer thinks that a considerable section of the *Cinchonæ* are allied in their chemical and also in their microscopical characteristics to the *Ladenbergiæ*, whilst, on the other hand, some of the latter seem to reciprocate this alliance.

The writer does not, however, regard the "transitions" as insensible, but rather as by *well-marked and permanent intermediate forms*: he looks upon the *Cinchonæ* not as he would upon the *Salices*, for instance, in which latter family it seems immaterial how many or how few are the number of species or varieties recognized, since a Willow is still the same plant under whatever form, and it was supposed that this was the case with the *Cinchonæ* when the genus was first established. The *Quina primitiva* was supposed to have a kind of recognized *typical* character, and a superiority which was claimed as distinguishing the bark of Peru, or of New Grenada, as viewed by the advocates of the products of these different regions. It was thought sufficient to distinguish the few varying kinds of cinchonaceous plants that were at first recognized by the prevalent form of the leaf as *cordifolia*, *lanceifolia*, *oblongifolia*, *ovalifolia*, etc., thus confounding together even different genera through a premature classification.

This systematizing tendency has since, in the opinion of the writer, led to the grouping together of *Cinchonæ* essentially different, since the reality much more resembles what might be the case, if there existed amongst the varieties of *Salix* some which closely approximated, in the timber and the bark, to the Oak and others, which in these respects counterfeited the Hazel, or as if a variety were to surprise us by producing Quinine instead of Salicine.

Thus the ovate or cordate or lanceolate form of leaf may appear to link together species of *cinchona*, which, on more profound study, may be seen to be entirely diverse in their character.

The writer may be permitted to illustrate his meaning as to premature attempts at systematic nomenclature by reference to

another department of science, taking as an instance the names of the alkaloids produced by these same plants, which, according to the first impressions, ranged thus:—

Quinine.	Cinchonine.
Quinidine.	Cinchonidine.
Quinicine.	Cinchonicine.

Further and more careful examination shows a different arrangement, as indicated by their properties in reference to the ray of plane polarized light.

Quinine.	Cinchonine.	Cinchonicine.
Cinchonidine.	Quinidine.	Quinicine.

Powerfully lævogyrate. Preëminently dextrogyrate. Feebly dextrogyrate.

This latter being the true relation, as shown by Dr. Herapath in his communications to the Royal Society, on chemical grounds, and by Mr. Howard in Reports to the Under-Secretary of State for India, on specimens of bark grown in that country, from which it appears that it is the order in which in the plants themselves these alkaloids are produced, normally in concert, and under circumstances of changed locality are supplemented, or even superseded by each other. Thus the quinine-producing *Calisaya* forms always *some*, and abnormally *much* cinchonidine, and the cinchonine-producing *C. micrantha* of Peru forms in India a large product of quinidine.

Mr. Howard thinks the species of *Calisaya* can be best studied in connection with the different geographical centres, the products of which he proposes briefly to review, so far at least as concerns their most prominent species, beginning with Bolivia.

### *The Barks of Bolivia.*

*Cinchona Calisaya*, Weddell.—This species certainly merits the first mention. It is beyond all question the first in importance in commerce, as furnishing the bark most largely used in the production of the precious medicine quinine. It contains this product in remarkable purity, with very little admixture of any other alkaloid—a fractional quantity of cinchonidine and cinchonine being (in the best specimens) the only exception.

It is not to be supposed that the products of wild forests

should be kept carefully select in commerce, and consequently the rate of produce in alkaloid, from such mixed parcels of bark, falls below that of the genuine tree ; but Mr. Howard has satisfied himself, by the examination of carefully chosen specimens of Calisaya, of the existence of alkaloid equal to five per cent., and in one or two specimens even seven or eight parts in a hundred, of sulphate of quinine. This is more than double the product assigned by the late M. Delondre, whose "Quinologie" he regards as a very valuable repository of knowledge, although (as is always the case) subject to some little correction.

The average produce of Calisaya bark in quinine,\* though falling very far short of the exceptionally fine specimens before mentioned, is still considerably above that obtained by M. Delondre, and the product in cinchonine less by two-thirds than he states, only it may be that he includes the cinchonidine in the same category. These observations seem of importance in reference to the cultivation of the species in India. It must not be supposed that the large products obtained by Dr. De Vrij and Mr. Howard from the *Cinchona succirubra* grown by M'Ivor, are the measure of the superiority of this species over the Calisaya. In the writer's opinion, the reverse is the truth, and though, from some cause, equal success has not been attained with the latter in the East Indies, he does not at all despair of seeing the Calisaya reassume there its rightful supremacy as the queen of all quinine-growing species.

He is the more confirmed in this hope, because the Calisaya, though found so delicate in India, is growing luxuriantly under double glass in Mr. Howard's stoves,—one raised from seed sent by Sir R. Murchison to Kew in May, 1864,† two or three inches in height when first planted out in October, 1864,—having, in

\* Not contained in the bark as *Sulphate*, as Delondre and Bouchardat's work might lead the reader to suppose.

† Dr. Hooker obligingly traced out the history of this plant by application to Sir R. Murchison, who says: "The cinchona seeds I sent you in 1864 were brought home by Mr. David Forbes, a great explorer of the Peruvian and Chilian Andes. I know that he attached some value to these seeds, which he told me were from trees of the very first quality in their bark and fructification."

little more than two years, attained an elevation of more than seven feet and spreading in every direction.

Mr. Markham says,\* "The *C. Calisaya*, the most famous of all the South American bark trees, and which, in its native forests, is alike the most beautiful and the richest in quinine, has not been a success in India. I was grieved to see the plants of this species only five feet ten inches high, and six and a half inches in girth, at an age of three years, while their stunted and shrubby appearance, with dim colored leaves, is as different as possible from the glorious *Calisaya* of the Caravayan forests."

Mr. Howard is endeavoring, in correspondence with Mr. M'Ivor, to ascertain the occasion of this contrast. It is not impossible that something may be due to the different effects of light passing twice through glass, by which means, a large portion of the actinic power (about half, as ascertained by photographic effects) is arrested. Mr. Markham says,† that in a position which he examined "exposed to the full glare of the sun, there was a profusion of *Melastomaceæ* and no *Cinchonæ*," for "the latter evidently dislike very exposed situations;" and again he says, "the *Calisaya* avoids the banks of a river, never being found within several hundred feet of it; it prefers the steepest declivities of the mountain sides, and a great deal, though not too much shade." Mr. Markham speaks of "a locality well adapted for the growth of the *Calisaya*," where young plants receive shade from taller trees, while they also enjoy plenty of sunshine through the spreading branches. Perhaps this has not been sufficiently attended to in India.

It is further evident that there are very distinct varieties of the *Calisaya*, and that it is by no means certain that the kind hitherto cultivated by Mr. M'Ivor is the best, although "descended from those procured by Dr. Weddell himself, in the forests of Caravaya and Bolivia."

Dr. Weddell gave to one of these varieties (the *Calisaya morada*) the name of *C. Boliviana*, and described it as a separate species, but in an article communicated to the Botanical Society of France, in March, 1855, after having seen in his second jour-

\* In letter to the Under-Secretary, etc., 16th January, 1866.

† Letter to the Under-Secretary for India, June 9, 1860.

ney in Bolivia, new forms intermediate between the *C. Calisaya* and the *C. Boliviana*, this able botanist is disposed to regard the *morada* as a simple variety of the *Calisaya*. This agrees with what we know of the different barks, which are all, including the *Boliviana*, equally collected and imported as *Calisaya*. The bark of the *Calisaya morada* is never classed separately in commerce, and, indeed, it appears in Delondre and Bouchardat's well-executed plate i. as typical *Calisaya*; while, on the other hand, we find another well-marked variety, the *Calisaya blanca*, equally well figured by Goebel in his *Pharm. Waarenkunde*, plate vii., as also *China Calisaya*. Best executed and most characteristic of all, are Weddell's own figures of the bark, both of his *α. vera* and *β. Josephiana*. As far as the writer can judge, it is yet another variety which is now growing with him, the *Calisaya verde*, of which, as well as of the *naranjada fina*, *zambita*, *empedernida*, and one or two others, Dr. Weddell gave him specimens resulting from his second excursion to Bolivia.

For further information respecting this variety, the *Calisaya verde*, we must (for the present) turn to the Report by Mr. Markham of his visit to collect plants of the *Cinchonæ* in 1860. He says,\* "The bark collectors and other natives assured me that there are three kinds of *Calisayas*, namely, the *Calisaya amarilla* or *fina* (*α. vera* of Weddell), the *Calisaya morada* (*C. Boliviana* of Weddell), and the *Calisaya verde* or *alta*,—not mentioned, as far as I am aware, by any author. They say that the latter is a very large tree, generally growing very far down the valleys, and in much lower situations than the other varieties. The veins of the leaves are never purple, but always a pale green, hence the name. The guide Martinez had cut a tree of this variety, yielding six or seven cwt. of bark, including canuto or bark from the branches; and Gironda had seen a tree in the province of Mucacas, in Bolivia, which yielded ten cwt. of tabla, or trunk bark alone. The true *Calisaya* of Weddell only yields three or four cwt."

Such a tree as Gironda describes might probably be five feet in diameter, for Karsten, speaking of the *C. laneifolia* and *C. corymbosa*, says,† "trees are met with sixty feet in height,

\* Letter to the Under-Secretary for State, June 9, 1860. See 44.

† *Med. Chinاريندن*, p. 28.



whose stems measure five feet in diameter. A single such gigantic tree, which truly is not often seen, *yields ten cwt. dried, or thirty cwt. fresh bark.*"

It is highly probable that this is the sort which ought to be introduced into India, where its larger size, and probably more rapid growth, might render it a more valuable acquisition than the *a. vera* itself. Mr. Howard is the more disposed to think this, since from the size and appearance of the bark recently brought into this market from Bolivia, he is led to suppose that the collectors may have opened up fresh districts in which this kind abounds.

It is an important feature that the *verde* variety grows lower down the valley, and consequently in warmer regions than the other sorts. This may, at times, cause it to be less productive in quinine, but nevertheless, the richest specimens examined by Mr. Howard presented the characteristics of this variety.

The Calisayas of Bolivia thus seem to be most satisfactorily determined, and it remains only that Dr. Weddell should add to those labors, for which we are so much indebted to him, by publishing the materials which he has in hand to illustrate the remaining varieties of this species.

*The Barks of Loja, or "Crown Barks."*

*Cinchona officinalis*, Linnæus, *a. Uritusinga*.—The term *officinalis* has been (Mr. Howard thinks most correctly) restored by Dr. Hooker to the species which grew under his care from seeds sent by Don T. Riofrio, from the mountains of Uritusinga, near Loja. This is the *Cinchona Uritusinga* of Pavon, also the *Quina-quina* described by M. La Condamine, in 1738, and consequently the *C. academica* of Guibourt's Hist. des Drogues, and the *C. officinalis* of Woodville's Botany, vol. iii. p. 546. The plant flowered in the writer's possession in 1862, and a characteristic drawing, by Fitch, of the flowering branch, may be found in tab. 5364 of Curtis's Bot. Mag., which may be compared with that of the same species in the "Nueva Quinologia."

A plant of the above, about six feet in height, was presented by Mr. Howard to the Indian Government, and although it suffered from a sunstroke in the transit from Madris to Ootacamund, and lost all its leaves, it was restored, and by the skill of Mr.

M'Ivor increased by cuttings to the extent of now between 6000 and 7000 plants. It has since flowered, and a characteristic specimen has been brought home by Mr. Markham, together with a portion of the bark.

A sister plant of the above, together with another, its direct descendant, suffered from an irruption of smoke into the stoves in the past winter, and Mr. Howard was compelled to cut them down. This gave the opportunity for examining the bark, which yielded on percentage of the dried bark:—

Quinine (crystallizing both as sulphate and as oxalate),	. 1.36
Cinchonine (part cryst. from sp. w., the rest cinchonidine),	0.57

---

Total, . 1.93

A produce very much the same that bark of the same kind and age might have yielded in its native climate, and probably the first extracted from bark grown in Europe.

Although this kind has nearly become extinct in its native regions, it may regain its place in pharmacy, as it seems well adapted to India, and flourishes on the Neilgherries at an elevation of about 6000 feet.

Several other forms range themselves around this which we now constitute the central plant of the group, by restoring its original name. Mr. Howard ventures to propose the following arrangement of these, as one rendered necessary for the distinction of the barks in commerce, as these will soon come from India, and as the only way that he can see to extricate the subject from the confusion into which it has been thrown by premature attempts at generalization.

*Cinchona officinalis*,  $\beta$ . *Condaminea*.—Mr. Howard would drop the barbarous name *Chahuarguera*, given by Pavon to this plant, which is really the *Quinia primitiva*, as having been traditionally the one which cured the Countess of Cinchon. It is therefore worthy to bear the name *Condaminea*, bestowed upon it, and also on other forms of the plant by Humboldt and Bonpland, in whose "Plantas Equinoctiales" it is well shown in the *unshaded branch*, which is recognized by De Candolle as a very distinct form, from the shaded flowering branch producing a different sort of bark, to be afterwards described.

The bark of *β. Condaminea* is the rusty crown bark of Pereira,\* and of English commerce. M. Planchon agrees with Mr. Howard that the larger portions of the bark represent the *Quinquina nouveau* of Joseph de Jussieu.

*Cinchona officinalis, γ. Bonplandiana-colorata*.—This form of Loja bark was called, in the time of the Spanish dominion, *Colorado del Rey*.† It is well represented not only in the widely-dispersed herbarium of Pavon, but also by specimens sent home by Cross, both of a flowering branch and of the bark, from the Ravines of Cajamuna, near Loja, in 1861. The seeds sent home by this collector have vegetated well in India, and so successful has been the cultivation, that M'Ivor has already sent home bark fit for the English market, according to the estimation of the most competent judges. The plant is figured and described in Howard's "Illustrations of the Nueva Quinologia," as a variety of *Chahuarguera*, which name might very well be exchanged for the above.

*γ. Bonplandiana-lutea*.—These two sorts are probably merely the *macho* and *hembra* varieties (those in which the male or female element preponderates in the flower, etc.) of the same plant, but the barks produced are markedly different, and these differences have remained unchanged from Pavon's day to this. They both deserve well their old reputation, and, though scarce, are still found in commerce; growing together, Pavon says, and often coming together (sometimes intermingled) to the English market; but, though so nearly allied, not confused by insensible transition.‡

*Cinchona officinalis, δ. crispa*.—This form of Loja bark was described and named by Tafalla as *Cinchona crispa*, and is described by Mr. Howard under that head in his "Quinologia." Nevertheless it is his opinion that it is so manifestly one of the

\* Confounded by Pereira with the *Huamalies mince et rougeâtre* of M. Guibourt, which seems to belong to *C. purpurea*.

† "The Spanish creoles still have the custom of giving the name *real* or *del Rey* to the best, most beautiful, and most valued articles; thus every place has its *Palma real*, *Quina del Rey*, etc." (Karsten.)

‡ Darwin has shown, in an able paper communicated to the Linnæan Society on another family of plants, that the form of the flower is either *entirely macho*, or *entirely hembra*, not passing from one into the other.

forms of the Loja bark as to be best looked upon as above. It is the *Quina crespilla*, or *carrasquena* of the older botanists, and the *Quina fina de Loja* of modern trade.

The plant was found growing by Cross in a deposit of peat on the summit of the highest mountains (the Sierra Grande) around Loja. These Loja barks are adapted to grow on the roughest and most elevated portions of the Neilgherries, and also to flourish in Ceylon, and, beyond other sorts, to bear well the climate of the sub-Himalayan ranges, and there can be little doubt of their successful and profitable cultivation.

Dr. Seeman found the plant at a lower elevation, and excellent specimens were brought back by both these travellers, including the bark, concerning the source of which therefore no doubt can remain.

It is to be regretted that from the present confusion of nomenclature in India, it is difficult to ascertain what is meant by the descriptive terms there applied to the barks. If the above arrangement could be admitted, it would greatly simplify the matter, and be practically useful in its results.

Mr. Howard proceeds to a review of the grey barks of Huanuco, the red barks of Ecuador, the Pitayo barks of Popayan, and the lancifolia barks of New Granada, which will be published in the Proceedings of the Congress, and directs attention to the spelling of the name CINCHONA, or CHINCHONA, and to the allied genus CASSARILLA, or as called by the Germans, LADENBERGIA. Nothing would tend so well to settle these questions as the free expression of opinion at a botanical congress.

In conclusion, the writer expresses his opinion, that every well-defined region of the Andes has its own prevalent and characteristic *Cinchonæ*, which are incapable of being reduced to any one typical form; he believes that no species has been clearly proved to prevail unchanged from end to end of the cinchonaceous region, and thinks that forms which resemble each other in distant parts will be found analagous rather than identical.

\*.\* Dr. Weddel, after the reading of Mr. Howard's paper, assigned reasons for adhering to the Linnæan form CINCHONA, to which Mr. Howard subsequently gave his assent.—*London Pharm. Jour.*, July, 1866.

## ON THE APPLICATION OF DISINFECTANTS IN ARRESTING THE SPREAD OF THE CATTLE PLAGUE.

Report to Her Majesty's Commissioners.

BY WILLIAM CROOKES, F.R.S.

(Continued from page 363.)

19. Some disinfectants, however suitable in other respects, are too expensive, unsafe, or injurious to health, to be used: such are bromine, iodine, peroxide of hydrogen, hyponitric acid, and hyponitrous acid.

20. The value of excessive heat as a disinfectant is very great, but it is available only in a limited number of cases. It acts in two ways. Heat, to the boiling point of water, continued for half an hour or more, acts as an antiseptic, perfectly destroying the vitality of all germs of contagion, or virus cells. In this way clothing and similar substances are conveniently disinfected. Heat, pushed to destruction in the presence of air, acts as a disinfectant, by promoting oxidation. The disinfecting value of the combustion of infected substances is too well known to require further notice.

21. Hydrochloric acid gas (evolved from salt and oil of vitriol) is most irritating to the respiratory organs, and is very inferior in its action to both sulphurous acid and chlorine. Besides, when evolved in white-washed sheds, it unites with the lime on the walls, forming a highly deliquescent compound, chloride of calcium, which keeps them permanently damp. The employment of a dangerously corrosive body like oil of vitriol should also be avoided.

22. Oil of tar can also be removed from the list, its value entirely depending upon the small amount of the tar acids it contains (34). To the same class petroleum belongs. This body has been used with considerable success in Wallachia by M. Etienne R. Veron, who, in an interesting pamphlet, which he has taken great pains to draw up and forward to this country, (in the hope that it may prove as useful here as it has been on his estate), has given full details of the means he employed to extinguish (*étouffer*) the disease, and then keep it from his farms, in 1864.

Every animal which showed the least signs of disease was at once killed. He then caused all parts of the sheds, which could have been in contact with the animals, to be washed with petroleum, and the bodies of the cattle were afterwards rubbed over with a cloth soaked in the same material. The farm servants had orders to wash their hands, boots, &c., in a mixture of petroleum and water, and to sprinkle their clothes with the mixture, whilst a little petroleum was added to the animals' food and drink. Their excrements were frequently removed, and the floor sprinkled with petroleum. No dogs were admitted on any pretence.

For five days these precautions were rigidly observed, when they were somewhat relaxed. They were attended with complete success, and there is little doubt that, carried out as rigidly in this country, the same good results would ensue. A copy of M. Veron's pamphlet was forwarded to me, and many experiments have been made in consequence. Petroleum depends for its value upon a small quantity (1 or 2 per cent.) of either carbolic acid or a substance allied to it, and Dr. Angus Smith has shown that when this substance is removed by appropriate means the purified petroleum has no antiseptic value. This being the case, no experiments on the large scale were tried with petroleum, as they would necessarily be similar, but inferior in their results, to those of the tar acids.

23. The choice is therefore limited to the oxidizing disinfectants—chlorine and ozone, and the antiseptics—sulphurous and the tar acids. These are representative bodies, and numerous trials have been made with them before coming to a conclusion as to their respective merits; the results being embodied in the following pages.

24. I am bound to admit that the conclusion to which I have been forced to come is quite opposed to my preconceived ideas on the subject. I started with a strong bias in favor of chlorine and ozone, but the irresistible force of the arguments derived from my experiments has caused me to alter my opinion.

#### *Oxidizing Disinfectants.*

25. At first sight nothing appears more perfect than the

action of a powerfully oxidizing disinfectant, like chlorine or ozone, upon noxious vapors and septic germs. In presence of an excess of either of these agents, all organic impurity is at once burnt out, and reduced to its simplest combinations; and could we always rely upon the presence of a sufficient amount of either of these bodies, no other purifier would be needed. But in practical work on a farm these disinfectants are always very inadequate, except perhaps for half an hour or so during the day; at other times, the oxidizing agent has presented to it far more noxious material than it can by possibility conquer, and being governed in its combinations by definite laws of chemical affinity, the sulphuretted and carburetted hydrogen, the nitrogen- and phosphorus-bases, &c., would all have to be burnt up before the oxidizing agent could touch the germs of infection; whilst the continued renewal of the gases of putrefaction would be perpetually shielding the infectious matter from destruction.

It is here that the great objection lies to disinfectants which act by oxidation. If we arrange in a series (as set forth in part 12) the possible substances which may be met with in an infected shed, and gradually mix with them chlorine or ozonized air, we find that those vapors having strong and foetid odors, and which stand at the commencement of the list, are the first to go; whilst the actual virus of the disease—the organized particles which have no odor whatever—are the last to be attacked. But in using disinfectants of this class, the only test of efficiency which a workman would employ is the sense of smell, and I have on several occasions known it happen that a deodorized shed, to all outward appearances disinfected, was still in reality saturated with infection. It so happens that the stinking gases of decomposition are of little or no danger in the atmosphere, whilst the deadly virus-cells of infectious diseases are inappreciable to the sense of smell. Mere deodorization is therefore no protection whatever.

The following experiment tends to illustrate, if not to prove this:—Cheese mites were put into water mixed with strongly smelling cheese and sulphuretted hydrogen. Aqueous solution of chlorine was gradually dropped into the mixture from a burette. The smell of sulphuretted hydrogen was the first to go,

then some smell of cheese, but it required a considerable quantity of chlorine to kill the mites. Exactly the same experiment was now repeated, only leaving out the sulphuretted hydrogen and cheese. The chlorine now had nothing to divert its energy from the cheese mites, which were consequently killed before one-fourth the quantity of chlorine used in the first instance had been added.

Again, oxidizing disinfectants possess little if any continuous action. What they attack is destroyed perfectly, but what they leave has no special resistance to decomposition conferred upon it. They remove the products of decomposition, but they do not take away the power of further putrefaction.

In addition to these general faults possessed by oxidizing disinfectants, the following special objections may be urged against chlorine and ozone:—

26. *Chlorine*.—This agent requires to be liberated in the gaseous state by a chemical process. This at the outset is an objection, for experience shows that farm laborers are not fit persons to be trusted with the performance of a chemical experiment involving the use of corrosive acids. The smell of chlorine is very irritating to the lungs of diseased or convalescent animals; and instances have come to my knowledge in which permanent injury has resulted from its employment. Moreover, the cattle dislike it much. Its action is more energetic upon the valuable constituents of the manure than upon septic germs\*: it rapidly attacks ammoniacal compounds, the urea and hippuric acid, and considerably reduces the manurial value of farm-yard stuff. If much ammonia is present in the shed, chloride of nitrogen is likely to be formed, the vapor of which, even in minute quantities, is painfully distressing to the eyes of cattle and their attendants. Another great objection is that gaseous chlorine, being absorbed by the whitewash, soon forms chloride of calcium, (21, 28), the deliquescence of which will

\* I find it recorded in the *Medical Record* for March 15, 1866, that Dr. J. P. Loines, of New York, as the result of a series of experiments, has come to the conclusion that chlorine, in quantity sufficient to be irrespirable, has no effect upon the infecting property of the vaccine crust; and, reasoning from this analogy, he is of opinion that the same is the case with the virus of variola.



make the walls of the building permanently damp, and fitted to foster the vitality of virus-cells, should they fall upon them.

27. A plan of fumigation by chlorine has recently been recommended which appears to possess another disadvantage. It is based upon the decomposition of chlorate of potash by hydrochloric acid. This reaction does not evolve pure chlorine, but a gas called euchlorine (supposed to be a mixture of chlorine and chloric oxide.) The properties of this gas are different from those of chlorine, and nothing is known about its special value as a disinfectant. It is dangerously explosive, the act of transferring it from one vessel to another, or even the warmth of the hand, being sometimes sufficient to shatter the vessel to pieces with a loud report.

28. If commercial chloride of lime is used as the source of chlorine, there is the additional disadvantage that the compound into which it changes—chloride of calcium—is, as before mentioned, (21, 26), very deliquescent, and will leave the floors, walls, and especially the wood-work washed with it, permanently damp : whilst, if thrown in the solid state on the floor, it rapidly attracts moisture, and becomes unpleasantly wet. It also communicates a disagreeable odor to the hands when it is touched. It is one of the things most easily adulterated, and it would be scarcely possible to supply an ordinary consumer with a test by which he could ascertain its strength and purity.

29. *Ozone*.—This powerful agent attacks all kinds of organic matter with intense energy. But as in the case of chlorine, the specific substance which we most want to destroy would be nearly the last to go ; and, as it would be almost impossible to generate ozone in quantity in an infected shed, its energies would in most cases be spent in doing useless work. When much ozone is present in the air it acts hurtfully on the respiratory organs.

Owing to the extremely poisonous nature of phosphorus, and its ready inflammability, danger would arise from the production of ozone by the slow combustion of this element. In the hands of ordinary farm servants serious accidents from fire would be constantly occurring.

#### *Antiseptics.*

30. Oxidizing disinfectants produce their effect by actually

destroying infecting substances. Antiseptics act simply by destroying their activity. The former act more energetically upon dead than living organic matter. Antiseptics attack first the opposite end of the scale, and destroy vitality; they exert little or no action on the foul smelling and comparatively harmless gases of decomposition, but they act with intense energy on the inodorous germs of infection which these gases may carry into the atmosphere along with them.

If, therefore, the theory with which I started be correct; if the matter which conveys infection from one animal to another be of the nature of an organized germ; if it owes its tremendous powers of destruction to the presence in it of vitality,—then antiseptics are the only agents fitted to deal with this special case; for they leave almost untouched the crowd of simply odorous gases, and seek out and destroy the one thing to be feared. When I treat of carbolic acid, ample proof of the correctness of this view will be given.

31. *Sulphur Fumigation*.—Of all disinfecting processes, this is, perhaps, the oldest. Its action was well known in the days of Homer, for we read that Ulysses employed it to remove the smell of dead bodies.\* It is recorded by Ovid† that the shep-

\* Hom. Od., xxii., 481.

*Ulysses.* Οἷσε θέλειν, γρη῏, κακῶν ἀκος, οἷσε δέ μοι πῦρ,

ἽΟφρα θεῶλωσα μέγαρον . . . .

493. ἽΗρεγ' κεν δ' ἀρα πῦρ καὶ θέλειν αὐτὰρ Ὀδυσσεύς

Εὖ διεβέλεισεν μέγαρον καὶ δῶμα καὶ αὐλὴν.

O old woman bring brimstone, the relief of evils, and bring me fire, in order that I may fumigate with brimstone the house. . . . .

And then she brought fire and brimstone, and Ulysses well fumigated with brimstone the house, and the court, and the hall.

† Ovid, Fast., iv., 735, &c.

Pastor, oves saturas ad prima crepuscula lustra.

Uda prius spargat, virgaque verrat humum.

Frondebibus, et fixis decorentur ovilia ramis;

Et tegat ornatas longa corona fores.

Cærulei fiant vivo de sulfure fumi;

Tactaque fumanti sulfure balet ovis.

O shepherd purify the fruitful sheep at the earliest dawn: let the moist bow first sprinkle and sweep the ground. Let the sheepfolds be decorated with foliage and boughs fixed, and let a lengthy wreath ornament the doors. Let there be blue smoke of burning sulphur, and let the sheap bleat at being touched with the sulphur.

herds of Italy yearly purified their flocks and herds with burning sulphur, and passages in other writers show that they averted disease from them by this means.

Professor Graham, Master of the Mint, says, that of gaseous disinfectants "sulphurous acid gas (obtained by burning sulphur) is preferable, on theoretical grounds, to chlorine. No agent checks so effectually the first development of animal and vegetable life. All animal odors and emanations are immediately and most effectually destroyed by it."

The value of sulphurous acid in arresting the progress of the cattle plague, has been proved beyond a doubt by the experiments of Dr. Dewar, and my own results entirely confirm his. When, however, used by himself, it can be employed only very sparingly in sheds, when cattle are in them; it is very stifling, and its powerful deoxidizing action would retard the conversion of the peroxide of iron into protoxide by the act of respiration—a result equivalent to that produced by breathing an atmosphere containing less than its normal amount of oxygen, which has been shown by Dr. Angus Smith\* to be incompatible with health. For this reason I prefer to use it only as an additional precaution, relying principally upon other agents. Sulphurous acid acts in many cases through its affinity for oxygen, but it possesses also great antiseptic powers of its own, so that a slight exposure to it is sufficient to destroy the vitality of germs. The following experiment proves this:—

A mixture of sugar syrup and yeast was kept in a warm room until it became in a state of active fermentation. An aqueous solution of sulphurous acid was added, when the fermentation instantly ceased. When examined under the microscope after treatment with sulphurous acid, no apparent change was observed in the appearance of the yeast cells.

32. When sulphurous acid is produced in a white-washed shed, it unites with the lime on the walls, forming non-deliquescent sulphite of lime, one of the valuable ingredients in

\* "Report on the Air of Mines," by R. Angus Smith, Ph. D., F.R.S., being part of the Appendix to the Report of the Royal Mines Commission, London, 1864.

McDougall's disinfecting powder ; its good effect therefore does not cease as soon as the atmosphere is free from its odor.

The gaseous acid has a great affinity for water ; the natural moisture always present in clothing, or on the wood-work and other parts of cow-sheds most likely to retain infection, is able to absorb the gas in quantity sufficient to form a solution in contact with which virus cells cannot exist. When absorbed in this manner it is only very slowly evolved,—a fact which has been noticed by all who have been in sheds whilst undergoing this mode of purification,—the fumes of the burning sulphur being said to “hang about” the clothes for a considerable time. Articles of clothing, boots, tools, sacks, baskets, pails, ropes, and any other portable article which may require disinfection, are conveniently purified by allowing them to remain in a close shed whilst it is undergoing sulphur fumigation.

Sulphurous acid, in addition to its antiseptic qualities, is a deodorizer of considerable energy. It destroys the powerful odor of most of the offensive gases named in paragraph 12. It attacks and oxidizes sulphuretted hydrogen, entirely destroying it ; it neutralizes the strong smell of ammonia and other alkaline bases, converting them into sulphites, but without destroying their manurial value or losing its antiseptic properties. In this respect it differs in an important manner from chlorine.

The use of sulphurous acid is open to one or two objections. When absorbed on clothing or damp wood-work, it gradually oxidizes into sulphuric acid. In cow-sheds this is not of much consequence, as there is always sufficient ammonia present to neutralize it ; but if repeatedly formed on clothing, it will bleach the articles, and ultimately make them rotten. When neutralized with lime or ammonia, or other bases, the antiseptic value of the sulphurous acid is not impaired, but it is tied down to one spot, and prevented from acting in the atmosphere. When the sulphites thus formed are allowed to remain in contact with wet organic matter, they gradually decompose with evolution of sulphuretted hydrogen ; but this decomposition is stopped at once by an additional fumigation with sulphur, and if the sheds are cleaned out every day it will never occur. Sulphites have been used with success by Prof. Polli and Dr. De Ricci, both as

prophylactics and as curative agents, in diseases caused by blood-poisoning: in Dr. De Ricci's words, they neutralize the zymotic principle—the ferment—without being injurious to life.

33. *The Tar Acids (carbolic and cresylic acids.)*—These two bodies are so commonly known under the name of acids, that I shall continue so to designate them, although by chemists they are more generally classed with the alcohols. They have great similarity, and only within the last few months have they been met with separately in commerce, having hitherto been both called carbolic acid. Creosote, (*κρέας σωζεν*, to preserve flesh,) prepared from coal tar, one of the most powerful antiseptics known, was thought to be impure carbolic acid, until 1854, when Professor Williamson and Mr. Fairlie, in an investigation of it, discovered that it was a mixture of carbolic and cresylic acids. It was then taken for granted that Reichenbach's creosote, from wood tar, had a similar composition, until Hlasiwetz, in 1858, showed that this creosote was a different body from carbolic or cresylic acids. Finally Dr. Hugo Muller, in 1846, discovered that true creosote and its analogue guaiacol belonged to a different class of bodies, and consisted of methyl-oxy-phenic and methyl-oxy-cresylic acids. No experiments on the large scale have yet been tried with true creosote, as I have only been aware within the last few weeks that this compound could be obtained in quantity.

Pure carbolic acid is a white crystalline solid, melting at  $34^{\circ}$  C., and distilled at  $180^{\circ}$  C.; a trace of water or oily impurity renders it liquid, and for disinfecting purposes it is always supplied in this form, to avoid the extra expense and trouble needed for the separation of the last traces of impurity; cresylic acid is liquid, it boils at  $203^{\circ}$  C., and closely resembles carbolic acid in odor and other properties. Before the commencement of these inquiries it was thought to be of little or no value as a disinfectant, but Dr. Angus Smith has lately shown that it rivals, if it does not surpass, carbolic acid in antiseptic properties. For the present purpose of cattle plague disinfection it is immaterial which acid is used, and to avoid unnecessary repetition I shall use the term carbolic acid to express either acid, or the commercial mixture of the two acids.

34. From time immemorial carbolic acid, creosote, or bodies containing them, have been used as antiseptics. Passages in Pliny, read by the light of chemical science, show that the Egyptians used for embalming their mummies a compound made from pitch, which must have contained large quantities of creosote. Carbolic acid is the active agent in tar, which, either in its ordinary state or burnt as a fumigator, has always held high rank amongst disinfectants. Pitch and tar were the most popular medicines in use against the cattle plague when it visited this island in the last century; the animals being preserved against contagion by having their noses and jaws rubbed with tar, whilst the cow-houses were disinfected by burning pitch and tar in them (in which process a certain quantity of the vapors of carbolic acid would escape combustion.) The almost universal custom of burning gum resins and odoriferous woods in connection with religious ceremonies may have originally arisen from the disinfecting powers of the creosote in the smoke. The well-known efficacy of smoke in preserving meat is entirely due to the presence in it of this agent.

Pitch oil, oil of tar, and similar products owe their value entirely to carbolic acid (22.) This body may in fact be called the active principle of tar, just as quinia is the active principle of bark, or morphia of opium, and it has the advantage of being easily prepared in any country where coal or wood can be obtained.

35. Sulphurous acid probably owes some of its antiseptic value to its affinity for oxygen, whereby the oxidation of the matter under treatment is retarded. It has been suggested that the value of carbolic acid is due to a similar property, and that it acts merely by preventing oxidation. It being important to a thorough understanding of its action that this point should be settled, the following experiments were made:—

I. Lumps of metallic sodium were cut with a sharp knife: the progress of the oxidation could be readily followed by the change of color of the surface. The experiment was tried several times in an atmosphere strongly charged with the vapor of pure carbolic acid and of cresylic acid; comparative experiments being made

at the same time in pure air. No difference in the rate or amount of oxidation could be detected.

II. A colorless solution of subchloride of copper in ammonia was prepared and divided into two parts; one being mixed with a little carbolic acid. On pouring them through the air into flat white dishes, no difference in the progress of the oxidation could be detected.

III. A mixture of pyrogallie acid and solution of potash was shaken up in a large stoppered bottle. It was then opened under water, and the amount of absorption of the atmospheric oxygen noted. The same experiment was repeated after the addition of carbolic acid to the potash solution. The same quantities were used and the agitation was continued for the same time. On again opening the bottle under water the absorption was found to be the same as before.

IV. The last experiment was repeated, substituting crystals of sulphate of iron for pyrogallie acid. The result showed equally that the presence of carbolic acid exerted no retarding influence on the oxidation.

V. Iron filings were shaken up in water with the same result.

VI. A "philosophical lamp" was made by arranging a platinum spiral over the wick of a spirit lamp, containing alcohol mixed with a little ether; on lighting, and then blowing it out, the platinum continued to glow brightly. Pieces of solid carbolic acid were then carefully placed in the cup of the brass wick holder, surrounding, but not in contact with the wick. The heat soon melted the acid and raised its vapor round the platinum spiral, but without occasioning any alteration in the brightness of its glow.

VII. Lead pyrophorus was poured into two long and narrow jars of air, one of which had its interior moistened with liquid carbolic acid. Not the slightest appreciable difference could be detected between the rapidity of oxidation in the two jars.

VIII. Paper moistened with sulphate of manganese solution, and dried, was dipped into caustic ammonia, both with and without carbolic acid. No difference whatever could be detected in the rate of its darkening.

These experiments prove conclusively that the tar acids have no special power of retarding oxidation.

36. Other experiments were then instituted in the endeavor to understand more clearly the mode of action of carbolic acid.

IX. Some meat was hung up in the air till the odor of putrefaction was strong. It was then divided into two pieces; one was soaked for half an hour in chloride of lime solution, and was then washed and hung up again; the offensive smell had entirely gone. The other piece of meat was soaked in a solution of carbolic acid containing 1 per cent. of the acid; it was then dried and hung up. The surface of the meat was whitened, its offensive odor was not removed, though it was masked by the carbolic acid. In two days' time the bad odor had quite gone, and was replaced by a pure but faint smell of carbolic acid. In a few weeks' time the pieces of meat were examined again. The one which had been deodorized with chloride of lime now smelt as offensively as it did at first, whilst the piece treated with carbolic acid had simply dried up, and had no offensive odor whatever. It was then hung up for another month and examined; no change had taken place.

X. A piece of fresh meat was soaked in a 1 per cent. aqueous solution of carbolic acid for one hour; it was then wrapped in paper and hung up in a sitting-room in which there was a fire almost daily; at the end of ten weeks it was examined. It had dried up to about one-fourth of its original size, but looked and smelt perfectly good and fresh, a very faint odor of carbolic acid being all that was perceptible. It was soaked for twenty-four hours in water, and then stewed with appropriate condiments and eaten; it was perfectly sweet, and scarcely distinguishable from fresh meat, except by possessing a very faint flavor of carbolic acid, not strong enough to be unpleasant.

XI. Animal membranes in forms of gut, skin, and bladder, were perfectly preserved if immersed direct in aqueous solution containing 1 per cent. of carbolic acid; but if previously moistened with water, and then immersed in dilute carbolic acid, the preservation of the skins was not so complete.

XII. Animal size and glue, mixed in the form of solution,



with small quantities of carbolic acid, were perfectly preserved from change even in hot weather.

These are important experiments. They point out in a striking manner the difference between mere deodorizers and antiseptics. Hitherto attention has been almost entirely confined to the deodorization of gases arising from putrescence. The effect has been combatted, whilst the removal of the cause has received scarcely any attention. Chloride of lime, one of the strongest of the class of deodorizers, acts, as has been shown, only on the gases of existing putrefaction, but it has no influence over the future. Carbolic acid, on the other hand, has scarcely any action on fœtid gases; but it attacks the cause which produces them, and, at the same time, puts the organic matter in such a state that it never re-acquires its tendency to purify. — *Lond. Chem. News*, June 1, 1866.

(To be Continued.)

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#### OBSERVATIONS ON THE ORIGIN AND GEOGRAPHICAL DISTRIBUTION OF GUM COPAL IN ANGOLA.

BY DR. WELWITSCH.

This was a *résumé* of the author's notes and observations on the subject of copal, made during his travels in tropical West Africa, and if, he observed, "they do not lead to a conclusive result, especially in the indication of the species of trees which at present furnish, or may have formerly furnished, this resin, I hope at least to show that nearly all opinions published on this subject by foregoing authors are more or less erroneous." The gum copal, which is called by the Bunda negroes Ocote, Cocoto, or Mucocoto, is mostly found in sandy soil, in the hilly or mountainous districts all along the coast of Angola. The limits within which, in Western Tropical Africa especially, gum copal is at present or will hereafter be found, was stated to be coincident with the distribution of *Adansonia digitata*. In the province of Angola, the lands belonging to the government of Benguella, extending south of the Cuanza River, yield the most. The quantity exported from Benguella during the period of from 1850 to 1860 amounted to 50,000 arrobas,

or 1,600,000 lbs. per annum. This resin is dug out of the loose strata of sand, marl, or clay, or else is found in isolated pieces washed to the surface by heavy rains, or exposed by earth-falls, such isolated pieces inducing the negroes to dig for larger quantities in adjacent spots. The search is sometimes carried to a depth of eight or ten feet; and is in certain cases combined with the gathering of the *Urzella*, that is, the different varieties of *Rocella fuciformis*; and also with the collection of several other gums, including gum arabic, which is found on the *Acacias* of these countries. The copal, being of unequal value, has to be sorted when brought to market; it is mostly classed according to color, the deeper-colored being generally worth double as much as the lighter sort, and the price is determined by weight. The lumps of copal vary in size, but are rarely found larger than a hen's egg, though occasionally they weigh 3 or 4 lbs. The pieces are all covered with a whitish earthy crust, which sometimes exhibits veins or network. The occurrence of this crust was regarded by the author as proving that after falling from the mother tree they were forcibly transported by floods or earth-falls, and imbedded in the soil in which they are now found. The total annual export of gum copal from all the districts of Angola was estimated at 2,000,000 lbs. As to the origin of this West African copal, the author concluded that it was the exudation of some tree, though now found in a fossilized state, many of the pieces showing distinctly the remains of bark to which they had adhered. Whether all the varieties come from the same tree he regarded as a question remaining to be solved, but his observation had tended to establish the conviction that the differences were attributable to the age of the tree, or the nature of the soil on which it grew. According to Dr. Daniel, the Sierra Leone copal comes, in part, from a tree described by Mr. Bennett as *Guibortia copalifera*, and which Mr. Bentham has since named *Copaifera guibourtiana*; though he also states that a considerable portion of it is washed to the surface of the earth, and is therefore of a fossilized character. The author concluded a lengthy review of the supposed sources of copal by observing, "that West African copal, and probably all gum resins exported under this name from tropical Africa,

may be looked upon as a fossil resin, produced by trees which in long past periods adorned the forests of that continent, but which at present are either totally extinct, or exist only in a dwarfed posterity." This, he remarked, would be all the less surprising if the consideration were taken into account that "tropical Africa, the home of this copal, is at the present moment the least explored continent: and if it were further borne in mind that after another analogous resin, the amber, became known and brought into practical use, more than 500 years elapsed before the learned Dr. Goeppert, whilst pointing to its fossil nature, succeeded, with some degree of probability, in tracing its origin to coniferous trees."—*London Pharm. Jour.*, July, 1866, from *Gardeners' Chronicle*.

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## ORCHID TEA.

BY JOHN R. JACKSON.

To have to look to the Orchid family for any large staple articles of trade other than Vanilla, would be not only to look to a new field, but also to a very interesting one. The application of the leaves of one of these plants as a substitute for tea has lately come under my notice. The product has been heard of before in its native country, but never, so far as I know, in fashionable or civilized society. It has, however, now made its appearance in Paris as a regular article of trade, and is highly recommended as a most agreeable beverage.

The plant yielding this new description of tea is the *Angræcum fragrans* of Thouars, an epiphytal orchid of the island of Bourbon, where it is known and used under the name of "Faham." This word, once an obscure native name, is now, if we are to believe the enterprising French firm who has just introduced it, destined to become a "household word," for "Faham" is the name under which it is now sold in Paris, and the word appears in large letters upon the boxes in which it is packed, as well as upon the circulars accompanying them. The headings of these circulars run as follows:—"Faham, from the Isle of Réunion, imported from and manufactured at Réunion." There is also a rough, but not at all a bad cut of the plant producing it.

The circular itself begins by saying that tea proper has never been well received in France, owing to the wakefulness resulting from its use, which has caused many persons to reject it altogether, while many of those who do use it drink it in default of a better substitute. The circular then goes on to state that it is for the purpose of remedying this state of things that the new infusion is intended; not to replace tea, which has indisputable advantages, but to afford an opportunity of choosing between two beverages, equally beneficial and useful. "Faham is not a new production. From time immemorial the natives of the islands of Réunion and Mauritius, though situated as it were at the very gates of China, have preferred it to tea; every traveller has partaken of their preference; one of our most illustrious writers, George Sand, eulogizes it in the midst of the fine description which she gives of the Isle of Bourbon,—a eulogy which cannot be suspected of puffery, inasmuch as it was written thirty years before the introduction of Faham into France was thought of. Every work on botany of any importance similarly places it in the foremost rank of the beneficial productions of this favored clime. The difficulties experienced in the gathering and manufacture of Faham on a large scale, and consequently the almost impossibility of procuring a sufficient quantity to recompense the labor of obtaining it for consumption, and also its very high price, have alone prevented until now this valuable article of diet from being imported into France. After many fruitless attempts, these obstacles have been overcome.

"Faham belongs to the family of Orchids; it grows upon the high slopes of the island of Réunion, in the midst of almost inaccessible forests. It possesses a taste differing greatly from that of tea, and is preferred by the majority of persons who have tasted it. It can be used as a substitute for tea on all occasions, as it combines its tonic and digestive qualities, free from the sleepless effect. It possesses an aroma of great delicacy, capable of being rendered more or less pungent according to the quantity used, and it gives forth a most agreeable perfume; after being drunk it leaves a lasting fragrance in the mouth, and in a closed room the odor of it can be recognized long after. This beverage has the further advantage over tea, which requires to be drunk

at the time of making, that it can be reserved for a future occasion if requisite, and may either be taken cold or made hot again. Milk, or spirits in small quantities, especially rum, serve to develope its aroma, and, lending it additional delicacy or greater strength, render it a delicious drink. Lastly, this valuable plant is made use of to flavor custards and ices, to which it communicates its delicate fragrance.

“To be taken as a warm beverage, the leaves and stalks should be placed in cold water, in about the proportion of one gramme to a tea-cup, more or less, as the consumer may desire it of a greater or lesser degree of strength. The water should be immediately made to boil for about the space of ten minutes in the tea-kettle or other closed vessel. It should then be emptied into the teapot or tea-cups and sweetened accordingly.”

A sample of this new kind of tea has recently been received at the Kew Museum; it was packed in a very neat canister-shaped box, similar to those now sold in Paris. These boxes are of two sizes, the smaller containing material sufficient for making fifty cups of Faham, and sold at 2*f.* 50*c.*, and the larger one hundred and fifty cups, and sold at 5*f.* Upon opening the box in question the perfume emitted was exceedingly powerful, and very similar to that of the Tonquin bean.\* The leaves, unlike those of tea, appear simply dried, not shrivelled by heat, but are as flat as we should find them in any herbarium. The absence of any artificial coloring matter, or roasting, accounts for the very light color of the infusion.

No doubt there are many persons who would prefer the fragrance of this article to the aroma of Chinese tea, but for my part I give preference to the latter—perhaps prejudice may have something to do with it. The perfume from the teapot is certainly very agreeable, and is an undoubted novelty; and if Fa-

\* [The leaves of *Liatris odoratissima*, on being dried, possess a strong odor of Tonka bean, and contain coumarin, which crystallizes on the surface. It is used for keeping clothes from moths in North Carolina. Our attention has been recently recalled to this plant by Mr. Walker Meares, of Wilmington, N. C., who calls it the *Vanilla plant*. Its odor lacks the delicacy of Vanilla, but will no doubt make “*Faham*,” and might be tried by our North Carolina correspondent.—EDITOR AM. JOUR. PHARM.]

ham came into general use, this domestic article would serve the twofold purpose of a teapot and a "perfume vaporizer." Doubtless if these leaves can be obtained in quantities sufficient for consumption as tea, the French perfumers might also import them to advantage, if for no other use. Powdered, they would make excellent sachets.

In the Museum at Kew are some cigars made of the leaves of *A. fragrans* simply rolled in a thin tobacco leaf. They are probably very agreeable smoking, but I am unable to say if this application is a common one in the island of Bourbon, or whether these specimens are rather a curiosity.—*Lond. Pharm. Journ.*, July, 1866, from *Gardeners' Chronicle*.

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#### ON THE DETECTION OF IODINE.

BY M. CAREY LEA.

Where iodine exists in the form of hydriodic acid, or the iodide of a base, two methods are commonly employed to put it into a condition to be detected by the starch test. One of these is by the action of nitric acid, the other by chlorine or bromine water. The latter is the more delicate, but has the disadvantage that if the chlorine or bromine be added in excess, the reaction is missed.

It occurred to me, while engaged in testing for iodine, that the facility with which that body is eliminated from its hydrogen and metallic combinations by *chromic acid* would make the latter substance a valuable means of bringing about the starch reaction, and a few experiments completely confirmed this view.

If, for example, we take an extremely dilute solution of iodide of potassium, such that the addition of nitric acid and starch produces no perceptible effect, the further addition of a single drop of very dilute solution of bichromate of potash will instantly bring about the characteristic reaction.

When chlorhydric acid is substituted for nitric, the effect of the bichromate is (as was to be expected) still more marked. The test has then the full delicacy at least of the chlorine test, with this great advantage, that an excess of the reagent does not prevent the reaction.

As to the delicacy of this test, the following observations were made :

With solutions of iodide of potassium up to one hundred thousandth (1 : 100,000) the precipitate was abundant, becoming less blue and more tawny as the dilution increased. Beyond this point the distinctness rapidly fell off. The indications were observable at one-four-hundred-thousandth. With a solution of one-eight-hundred-thousandth it was doubtful whether any effect was evident, though still it was thought that a darkening was produced.

The experiment can be made in two ways, according to the result desired.

If it is wished to observe the effect of the chromic acid in increasing the delicacy of the indication, add the acid and starch to the very dilute solution of iodide, and then when the extreme dilution is such that no reaction appears, a drop of solution of bichromate instantly produces it.

But in employing the reagent in the search for iodine, add the starch to the liquid to be tested, stir it up, add a drop of dilute solution of bichromate, enough to communicate a pale yellow color, and finally add a few drops of chlorhydric acid. The test is then the production of the characteristic precipitate, or in case of great dilution, approaching to a half-millionth, merely a tawny shade given to the solution.

It seems scarcely necessary to say that if a very great excess of acid is used, and too much bichromate, the starch may be made to reduce the bichromate. Even this, however, cannot deceive, for a bluish-green solution is thereby produced, whereas the indications of iodide are in the order of their strength : blue precipitate, tawny precipitate, tawny solution. Unless in the case of very exceptional dilution above spoken of, a well marked blue precipitate is always obtained.

The examination of the delicacy of the reaction with very dilute solutions was made at a temperature of 65° F. or thereabouts. This fact requires to be taken into account, as according to some experiments of Fresenius to be found in the *Jahresbericht* for 1857, the delicacy of the starch test increases as the temperature falls, so that at 0° C. a fainter trace can be rendered evident

than at  $12^{\circ}$  C., and so on: the difference is asserted to be material. Fresenius' experiments were made with sulphuric acid and hyponitric acid, and the delicacy of the reaction obtained by him at corresponding temperatures seems to fall a little short of the above.—*Am. Jour. Science and Arts*, July, 1866.

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### ON THE PREPARATION OF HYDROFLUORIC ACID.

BY W. P. DEXTER.

Few chemists have at their disposal a distillatory apparatus of platinum, and the cryolite from which the purest hydrofluoric acid is prepared; and the shape commonly given to the dome of platinum retorts is such as to allow matter which may be projected upon it to flow down the neck into the receiver. The acid made from fluor spar in such a retort I have found to contain sulphate of lime. A simple remedy for this defect would be to fix in the dome a perforated disc, or ring, over the aperture of which another disc of less diameter, but larger than this aperture, is supported by three strips of platinum riveted to the ring, both being made of silver platinum foil.

A dome of platinum attached to a leaden vessel seems to me a half-way measure, combining the disadvantages attending the use of both metals.

To those who are not in possession of an apparatus of platinum, I can recommend from experience the following comparatively inexpensive arrangement.

It consists of the ordinary leaden bore, (mine is 6'' high by  $3\frac{1}{2}$ '' internal diameter,) made of a piece of lead pipe into which a bottom of lead is cast, and provided near the top with a small and short tube for the escape of the gas. The tube must incline slightly from the retort *upward*, otherwise whatever is condensed or projected upon it will flow downward and the product be contaminated, at least, with lead. Into this tube a smaller one of platinum is luted, which is bent into the shape of a quarter of a circle so that the farther end points downwards; this end is soldered with gold into the bottom of an inverted platinum crucible. An old one, perforated and cracked, such as is generally to be found in a laboratory, answers perfectly for the purpose.



The inverted crucible hanging like a bell at the end of the tube, when immersed in water contained in a vessel not very much exceeding it in diameter, offers a large surface for the absorption of the acid gas, while a retrocession of the liquid from absorption or change of temperature is impossible.

The cover to the retort may be cast in one piece with a shoulder, or be made of two discs of lead of the size of the inner and outer diameters of the bore, and held together by a ring of lead cast into them and serving as a handle. For a lute I spread a thin layer of gypsum on the surfaces in contact, and cover the joint on the outside with a paste of rye meal.—*Am. Journ. Sci. and Arts*, July, 1866.

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#### DEPORTMENT OF THE MOST IMPORTANT ALKALOIDS WITH REAGENTS, AND A SYSTEMATIC METHOD OF EFFECTING THE DETECTION OF THESE SUBSTANCES.

BY A. WADGYMAR, M. D., Professor of Chemistry and Botany in the Humboldt Medical College, at St. Louis.

The detection and separation of the vegeto-alkalies, or alkaloids, is a task of greater difficulty than that of most of the inorganic substances and bases. Although this difficulty is owing partly to the circumstance that scarcely one of the compounds which the alkaloids form with other substances is absolutely insoluble, or particularly characterized by its color or any striking property, yet must be ascribed to the want of accurate and minute investigations of the salts and other compounds of the alkaloids, and of the products of their decomposition. We, therefore, generally see and apprehend the reactions only in their extended manifestations, but without being able to connect them with the causes producing them, which makes it impossible to understand all the conditions which may exercise a modifying influence.

Although, therefore, in the present imperfect state of our knowledge of these bodies, an attempt to define their deportment with reagents, and base thereon a method of effecting their separation, or, at least, their individual detection, must necessarily fall far short of perfection, yet, having made a great many experiments on the nature and behaviour of these substances, I

will attempt here, for the benefit of young chemists, and more particularly pharmaceutists and physicians, to describe, in some measure, the reactions which the most important of the alkaloids manifest with other bodies, and to lay down a systematic method of effecting their individual detection.

The classification of the alkaloids into groups, a plan which I have adopted from Dr. C. R. Fresenius, Professor of the Natural Sciences at Wiesbaden, Germany, is based upon their deportment with certain general reagents. I have verified by numerous experiments the whole of the reactions described in the following paragraphs :

FIRST GROUP.—Alkaloids which are precipitated by potassa, or soda, from the solutions of their salts, and redissolve readily in an excess of the precipitant of the alkaloids of which I propose to treat here: one only belongs to this group, viz. : .

Morphium ( $C_{34}, H_{19}, O_6$ ) = Mo.

Crystallized morphium or morphia ( $Mo + 2 Aq.$ ) usually appears in the form of colorless, brilliant, four-sided prisms; or, when obtained by precipitation, as a white crystalline powder. It has a bitter taste, and dissolves very sparingly in cold water, but more readily in boiling water. Of cold alcohol it requires ninety parts by weight for solution; of boiling alcohol from twenty to thirty parts. The solutions of morphia in alcohol and in hot water manifest distinctly alkaline reaction. This alkaloid is nearly insoluble in ether. At a moderate heat, crystallized morphia loses two equivalents of water. Morphia neutrallizes acids completely, and forms with them *salts of morphia*. These salts are readily soluble in water and in spirits of wine, but insoluble in ether; their taste is disagreeably bitter, and most of them are crystallizable.

Potassa and ammonia precipitate from the solutions of salts of morphia, generally after some time,  $Mo + 2 Aq.$  in the form of a white crystalline powder. Stirring and friction on the side of the vessel promote the separation of the precipitate, which redissolves with great readiness in an excess of potassa, but with more difficulty in ammonia. It dissolves also in chloride of ammonium, and, though with difficulty, in carbonate of ammonia. Carbonate of potassa and carbonate of soda produce the same

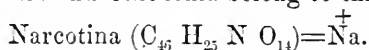
precipitate as potassa and ammonia, but fail to redissolve it upon addition in excess. Consequently if a fixed alkaline carbonate is added to a solution of morphia in caustic potassa,  $Mo + 2 Aq.$  separates, especially after previous ebullition, in the form of a crystalline powder. A more minute inspection, particularly through a magnifying lens, shows this powder to consist of small acicular crystals. Seen through a magnifying glass, which magnifies 100 times, these crystals present the form of four-sided prisms. Bicarbonate of soda and bicarbonate of potassa speedily produce, in solutions of neutral salts of morphia, a precipitate of hydrated morphia in the form of a crystalline powder. The precipitate is insoluble in an excess of the precipitant. These reagents fail to precipitate acidified solutions of morphia salts in the cold.

The action of strong *nitric acid* upon morphia, or one of its salts, in the solid state or in concentrated solutions, produces a fluid varying from red to yellowish red. Dilute solutions do not change their color upon addition of nitric acid in the cold, but upon boiling they acquire a yellow tint. *Neutral sesquichloride of iron* imparts to neutral solutions of morphia salts a beautiful dark blue color, which disappears upon the addition of an acid. If the solution contain an admixture of animal or vegetable extractive matter, or of acetates, the color will appear clouded and less distinct. If *iodic acid* is added to a solution of morphia or a salt of morphia, *iodine* separates. In concentrated aqueous solutions the separated iodine appears as a kermes-brown precipitate, whilst to alcoholic or diluted aqueous solutions it imparts a brown or yellowish brown color. The addition of starch paste to the fluid considerably heightens the delicacy of the reaction, since the blue tint of the *iodide of starch* remains still perceptible in exceedingly dilute solutions, which is not the case with the brown color imparted by *iodine*. As other nitrogenous bodies (albumen, casein, fibrin, etc., etc.) likewise reduce *iodic acid*, this reaction has only a relative value.

SECOND GROUP.—Alkaloids which are precipitated by potassa from the solutions of their salts, but do not redissolve to a perceptible extent in an excess of the precipitant, and are precipi-

tated by bicarbonate of soda, even from acid solutions, if the latter are not diluted in a larger proportion than 1:100.

Narcotina, Quinia and Cinchonia belong to this group.



1. Crystallized narcotina ( $\text{Na}^+ + \text{Aq.}$ ) appears usually in the form of colorless, brilliant, straight, rhombic prisms; when precipitated by alkalies, as a white, loose, crystalline power. It is insoluble in water. Alcohol and ether dissolve it sparingly in the cold, but somewhat more readily upon heating. Solid narcotina is tasteless; but the alcoholic and ethereal solutions are intensely bitter. Narcotina does not alter vegetable colors. At  $338^\circ$  it fuses, with loss of one equivalent of water.

2. Narcotina dissolves readily in acids, combining with them and forming salts. These salts have invariably an acid reaction. Those with weak acids are decomposed by a large amount of water, and, if the acid is volatile, even upon simple evaporation. Most of the salts of narcotina are amorphous, and soluble in water, alcohol and ether; they have a bitter taste.

3. Pure alkalies, and alkaline carbonates and bicarbonates immediately precipitate from the solutions of salts of narcotina,  $\text{Na}^+ + \text{Aq.}$ , in the form of a white powder, which, seen through a lens magnifying 100 times, appears an aggregate of small crystalline needles.

The precipitate is insoluble in an excess of the precipitants. If a solution of narcotina is mixed with ammonia, ether added in sufficient quantity, the narcotina which has separated upon the addition of ammonia, redissolves in the ether, and the clear fluid presents two distinct layers. If a drop of the ethereal solution is evaporated on a watch glass, the residue is seen, upon inspection through a lens magnifying 100 times, to consist of small, distinct, elongated, lance-shaped crystals.

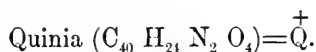
4. Concentrated nitric acid dissolves narcotina to a colorless fluid, which acquires a pure, yellow tint upon application of heat.

5. Concentrated sulphuric acid dissolves narcotina to a yellow fluid, which turns brown upon application of heat. A solution of narcotina in concentrated sulphuric acid, containing a slight

mixture of nitric acid, appears of an intense blood-red color, which disappears altogether upon the addition of a somewhat larger amount of  $\text{NO}_3$ .

6. If the solution of a salt of narcotina is mixed with chlorine water, it acquires a yellow color, slightly inclining to green; if ammonia is then added, a much more intensely-colored, yellowish-red fluid is obtained.

7. If narcotina, or one of its salts, is dissolved in an excess of dilute sulphuric acid, some finely levigated binoxide of manganese added, the mixture heated to boiling and kept in ebullition for the space of several minutes, the narcotina absorbs oxygen, and is converted into opianic acid, cotarnina (a base soluble in water) and carbonic acid.



1. Crystallized quinia ( $\overset{+}{\text{Q}}.=2\text{Aq.}$ ) appears either in the form of fine crystalline needles of silky lustre, which are frequently aggregated into tufts, or as a loose, white powder. It is sparingly soluble in cold, but somewhat more readily in hot water. It is readily soluble in spirits of wine, both cold and hot, but less so in ether. The taste of quinia is intensely bitter; the solutions of quinia manifest alkaline reaction. Upon exposure to heat it loses two equivalents of water.

2. Quinia neutrallizes acids completely. The salts taste intensely bitter; most of them are crystallizable, and for the greater part readily soluble in water and in spirits of wine. Acid solutions have a bluish tint.

3. Potassa, ammonia and the neutral carbonates of the alkalis produce, in solutions of salts of quinia, (if they are not too dilute), a white, loose, pulverulent precipitate of hydrated quinia, which, immediately after precipitation, appears opaque and amorphous under the microscope; but assumes, after the lapse of some time, the appearance of aggregated crystalline needles. The precipitate redissolves only to a scarcely perceptible extent in an excess of potassa, but more readily in ammonia. It is hardly more soluble in fixed alkaline carbonates than in pure water. If a solution of quinia be mixed with ammonia, ether added, and the mixture shaken, the quinia which has separated

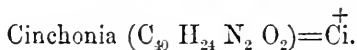
upon the addition of ammonia redissolves in ether, and the clear fluid presents two distinct layers. In this particular quinia differs essentially from cinchonia; by means of this reaction the former may, therefore, be readily detected in presence of the latter and separated from it.

4. Bicarbonate of soda also produces, and this both in neutral and acid solutions containing one per cent. of salts of quinia, a white precipitate. In acidified solutions, 1 gr.  $\bar{Q}$ . in 100 grs. of water acidulated, the precipitate forms immediately; if the proportion of the quinia to the acid and water is 1:150, the precipitate separates only after an hour or two, in the form of distinct needles, aggregated into groups. If the proportion is as 1:200, the fluid remains clear, and it is only after from twelve to twenty-four hours' standing that a slight precipitate makes its appearance. The precipitate is not altogether insoluble in the precipitant, and the separation is accordingly the more complete the less the excess of the precipitant; the precipitate contains carbonic acid.

5. Concentrated nitric acid dissolves quinia to a colorless fluid, becoming yellowish upon the application of heat.

6. The addition of chlorine water to the solution of a salt of quinia fails to impart a color to the fluid, or, at least, imparts to it only a very faint tint; but if ammonia is now added the fluid acquires an intensely emerald-green color. The solution, mixed with chlorine water, acquires a dark red color upon addition of ferrocyanide of potassium in excess.

7. Concentrated sulphuric acid likewise dissolves pure quinia and pure salts of quinia to a colorless fluid, which does not acquire any coloration upon being heated to the point of incipient evaporation of the sulphuric acid, but becomes afterwards yellow, and finally brown. Sulphuric acid containing an admixture of nitric acid dissolves quinia to a very faint yellowish fluid.



1. Cinchonia appears either in the form of pellucid, brilliant, four-sided prisms; fine, white, crystalline needles; or, when precipitated from concentrated solutions, as a loose, white powder. At first it appears tasteless, but after some time the bitter taste

of the bark becomes perceptible. It is nearly insoluble in cold water, and dissolves only with exceeding difficulty in hot water; it dissolves sparingly in cold dilute spirit of wine, more readily in hot spirit of wine, and the most easily in absolute alcohol. From hot alcoholic solutions the greater portion of the dissolved cinchonia separates, upon cooling, in a crystalline form. Solutions of cinchonia taste bitter and manifest alkaline reaction. Cinchonia is insoluble in ether.

2. Cinchonia neutralizes acids completely. The salts have a bitter taste of the bark; most of them are crystallizable; they are generally more readily soluble in water and spirit of wine than the corresponding quinia compounds. Ether fails to dissolve them.

3. Cinchonia, when treated cautiously, fuses without loss of water; subsequently white fumes arise which, like benzoic acid, condense upon cold substances in the form of small, brilliant needles or a loose sublimate, a peculiar aromatic odor being exhaled at the same time. If the operation is conducted in a stream of hydrogen gas, long, brilliant prisms are obtained. (Hlawety.)

4. Potassa, ammonia and the neutral carbonates of the alkalies produce, in solutions of salts of cinchonia, a white, loose precipitate of cinchonia, which does not redissolve in an excess of the precipitants. If the solution is concentrated, the precipitate does not exhibit a distinctly crystalline appearance, even though viewed through a lens magnifying 200 times; but if the solution was so dilute that the precipitate formed only after some time, it appears under the microscope to consist of distinct crystalline needles, aggregated into star-shaped tufts.

5. Bicarbonate of soda and bicarbonate of potassa precipitate cinchonia in the same form as in No. 4, both from neutral and acid solutions, but not so completely as the simple carbonates of the alkalies. In solutions containing one part of cinchonia to 200 parts of water and acid the precipitate still forms immediately; its quantity increases after standing some time.

6. Concentrated sulphuric acid dissolves cinchonia to a colorless fluid, which, upon application of heat, first acquires a brown, and finally a black color. Addition of some nitric acid leaves

the solution colorless in the cold ; but, upon application of heat, the fluid, after passing through the intermediate tints of yellowish-brown, becomes finally black.

7. The addition of chlorine water to the solution of salts of cinchonia fails to impart a color to the fluid ; if ammonia is now added, a yellowish, white precipitate is formed.

#### RECAPITULATION AND REMARKS.

The alkaloids of the second group are altered or precipitated by various other reagents besides those mentioned above ; the reactions, are, however, not adapted to effect their individual detection and separation. Thus, for instance, bichloride of platinum produces, in the solutions of the salts of the three alkaloids belonging to this group, a yellowish, white precipitate ; chloride of mercury, a white precipitate ; tincture of galls, a yellowish, white, flocculent precipitate, &c., &c.

Narcotina and quinia being soluble in ether, whilst cinchonia is insoluble in that menstruum, the former may be most readily separated by this means from the latter alkaloid. For this purpose the analyst may simply mix the solutions of the three alkaloids with ammonia in excess, then add ether, and separate the solution of quinia and narcotina from the undissolved cinchonia. If the ethereal solution is now evaporated, the residue dissolved in hydrochloric acid and a sufficient amount of water to make the dilution as 1:200, and bicarbonate of soda is then added, the narcotina precipitates, whilst the quinia remains in solution. By evaporating the solution, and treating the residue with water, the quinia is obtained in the free state.—*St. Louis Medical Reporter*, April and May, 1866.

(To be Continued.)

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#### NARCEIA.

M. Liné, formerly Interne de Hôpitaux, after a series of experiments with narceia in the wards of M. Delpech, gives the following *résumé* of his observations :

1st. Of all the alkaloids contained in opium, narceia possesses hypnotic power to the greatest extent. In the great majority



of cases neither morphia or codeia produce so long or so profound a sleep.

2d. Narceia causes only in a very feeble degree the physiological phenomena consequent upon the sleep produced by morphia and the salts of that base. Besides, the perspiration is much less abundant than after the use of opiates. Vomiting is rare; nausea and loss of appetite more common. Narceia, in its action upon the intestines, differs sensibly from morphia; instead of causing obstinate constipation, its effect, in small doses, is that of a gentle aperient. In larger doses it causes a diarrhoea.

3d. Narceia relieves pain, like all opiates.

Among the different effects produced upon the secreting organs, that upon the kidneys is nearly constant. Anuria, to a greater or less extent, is noticed particularly after rather large doses. Perhaps this peculiar action of narceia might be turned to account in the treatment of incontinence of urine in children.—*Druggists' Circular*, June, 1866, from *Gazette des Hôpitaux*.

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#### FACTS RELATING TO MAGNESIUM: ITS ACTION ON METALLIC SOLUTIONS, AND ITS APPLICATION TO TOXICOLOGICAL RESEARCHES.

By M. Z. ROUSSIN.

Every chemist is aware how uncertain, and how often at variance with the theory as well as the principles of the established classification, is the precipitation of a metal contained in a saline solution by a metal apparently more oxidizable. Whether secondary reactions, the presence of water, the nature of the acid, or the conductibility of the solution complicate a reaction which *a priori* seems so simple, it is certain that several metals have hitherto resisted precipitation in a metallic state by the contact of another metal with their aqueous solutions.

We refer more particularly to cobalt, nickel, iron, zinc, manganese, chromium, &c.

Experiment has shown that magnesium precipitates in a metallic state some of the above metals, which until then had resisted all attempts of this kind.

Slightly acidulated solutions of proto- and sesqui-salts of iron, of zinc, of protoxide of cobalt and of nickel, placed in contact with pure magnesium, cause an escape of hydrogen, and precipitation, in a metallic state, of the metals of these solutions.

All these metals, freed by washing from saline liquid, dried and then compressed, possesses great metallic brilliancy, and entirely dissolve in acids. Iron, cobalt, and nickel so obtained are highly magnetic; zinc takes the form of a large spongy mass, which the least compression renders brilliant.

Magnesium precipitates equally silver, gold, platinum, bismuth, tin, mercury, copper, lead, cadmium, and thallium.

Aluminium is not precipitated in a metallic state from its saline solutions.

Salts of chromium and of manganese form deposits by their contact with plates of magnesium, which have the characteristics of oxides of these substances, and which we reserve for further study\*.

Arsenic and antimony are not precipitated from their acid solutions by contact with magnesium; they combine with the hydrogen gas which is formed in this reaction, and pass off as arseniuretted or antimoniuiretted hydrogen.

Magnesium very readily decomposes water; in a very weak solution of common salt, of sal ammoniac, of some acid, &c., the metal will be oxidized, and a considerable disengagement of hydrogen take place. This gas is extremely pure, for the magnesium contains no silicium.

The foregoing qualities encouraged the hope that a substitution of magnesium for zinc in ordinary piles would offer a great

\* I have recently observed that a sodium amalgam shaken up with acidulous salts of chromium and manganese changes to an amalgam of chromium and manganese. The last two amalgams, purified by washing in acidulated water, then distilled in a current of hydrogen, leave the pure metals in the form of a pulverulent sponge. The amalgam of manganese is opalescent and crystalline; that of chromium is more fluid and less variable at the ordinary temperature. If the latter is heated in a small porcelain capsule in the air, the vapors of mercury mechanically carry away particles of chromium, which produce, whilst burning in a darkened room, a singular scintillation which ends in the sudden incandescence of the rest of the metallic chromium.—Z. R.

electro-motive force. Direct experiment confirms this theoretical inference. A small plate of magnesium, 0·1 gr. in weight, placed beside a plate of copper in a small tube of glass of six centimetres cube, filled with acidulated water, produced in nearly ten minutes an electro-magnetic appearance, and illuminated a Geisler tube 10 cent. long. If magnesium should ever become cheap, this would decidedly be the best way of producing electricity.

The preceding facts appear to us above all to give a special interest to toxicological researches on metallic poisons. A few words on the subject are necessary to give a clear idea of the importance of this new application of magnesium. In all true chemical researches respecting the diagnosis and extraction of compound metallic poisons, the experimentalist, after having destroyed the viscous, or any other organic matter under his analysis, at last finds a greater or less proportion of either a saline or an acid liquid, in which he has to discover and determine the minute proportions of poisonous metal. Whatever the agent used in the destruction of organic matter—whether sulphuric acid, chlorine, aqua regia, or nitric acid—the ultimate liquid is always very complex. Over and above the poisonous substance which it may contain, there is always a great deal of soda, lime, magnesia, phosphoric acid, hydrochloric acid, &c., &c.; and also in most cases, whether colorless or slightly colored, it contains some strictly organic substances, which are the necessary result of the action on such energetic agents as chlorine, aqua regia, and nitric acid.

In most cases it is possible to find and to separate the metal which determines the poisoning by a methodic use of such tests as hydrosulphuric acid, hydrosulphate of ammonia, &c. But not only do these processes, even in the hands of the most experienced chemists, offer but a limited sensibility, and are sometimes powerless merely from the effect of the complexity of the liquid under analysis, but they necessitate the sacrifice of a great quantity of the liquid in the indispensable preliminary researches. The use of the pile recommended by eminent toxicologists in isolating and precipitating poisonous metals contained in these liquids, has always given us incomplete results, and ex-

perience teaches us in this case that if the theory is favorable the practice leaves much to be desired.

Every chemist knows how rapid and complete in some cases is the precipitation of one metal by another in saline solutions. Several toxicologists, struck by the precision of this mode of precipitation and its ease of execution, have proposed its use in the toxicological researches of certain metals. We will limit our examples to the precipitation of arsenic by copper, (Reinsch's process), of mercury by tin or by copper, of copper by iron or by zinc, of antimony by tin, &c. These different experiments present two serious difficulties, to mention which will justify our remarks:—

1. The search for every poisonous metal requires a distinct operation and the employment of a different metal for precipitation; hence the necessity for numerous manipulations, and the considerable loss of the matters used in the experiments which these successive analyses necessitate.

2. The introduction into the liquids under analysis of metals either poisonous themselves, such as copper and zinc, or expensive ones, such as tin, presents grave dangers, and it may in some cases render the operation impossible, even to the expert chemist, if the poisoning is not precisely determined by the metal employed as the agent of precipitation, and which is partly dissolved in the liquids under analysis.

Were there a metal completely destitute of poisonous properties which the chemist might fearlessly introduce in excess into his liquids, and which had the property of precipitating all the metals whose salts are used by poisoners or which might occasion accidents, there is no doubt but that such a metal would enormously facilitate the researches of legal chemistry. Now it seems to us that magnesium offers all these advantages, and may thus be of the greatest service.

There are now prepared and offered to commerce great quantities of nearly pure magnesium. The original materials and the processes of its manufacture quite drive out of its composition the poisonous materials most dreaded by chemists—copper, lead, mercury, antimony, arsenic, zinc, &c. It is drawn into long slight ribbons well fitted for the delicate experiments

of the laboratory; it keeps equally well in a dry or moist atmosphere, and placed in a corked bottle it is safe from any alteration; its low equivalent displaces the ordinary poisonous metals by relatively small proportions of the precipitating metal. Magnesium and its compounds present no danger; it is one of the metals normally contained in the tissues and fluids of the animal economy, and the introduction of them into liquids to be analyzed does not cause the least difficulty. The silicium which was found in the first samples manufactured is now seldom seen; and it is easy to understand that the presence of some thousandths or hundredths of silicium or of soda would be no hindrance in the toxicological researches under discussion. Let us add (although the consideration is of small importance in such serious analyses) that the price of magnesium is now very moderate, and it will no doubt become still more so, should the demand increase. A rapid sketch of the reactions produced by the contact of a plate of magnesium with the different acidulous metallic solutions does away with any necessity for entering into the details of the specially toxicological operation. We will merely give a summary.

The acid liquids obtained from the viscera or other organic matters under analysis are concentrated by evaporation in a water bath, and brought to a syrupy consistence. The residue heated to  $125^{\circ}$  is redissolved in a small quantity of distilled water, then filtered.

We then arrange one of Marsh's ordinary apparatus, into which we introduce some water acidulated with sulphuric acid, and some grammes of magnesium ribbon. A considerable escape of hydrogen then takes place, which must be carried through a tube at a red heat in the middle, and ignited at the smaller extremity. If no rings are formed on the tube, and no spot on the porcelain plates held upon the flame of the gas, then successively introduce into the apparatus small portions of the suspected liquid. If either antimony or arsenic is present in the liquid, a ring will not be long in appearing, as in the ordinary Marsh's apparatus, and the flame flattened against the porcelain plate leaves there a shiny deposit. The spots and rings of arsenic are distinguishable from the spots and rings of antimony

by characteristics known to toxicologists, and which, therefore, it is unnecessary to mention here.

If the suspected liquids contain no trace of arsenic or antimony, they may contain other poisonous metals, such as copper, lead, mercury, zinc, &c. In this case the metals are found as flakes, powder, or sponge, either at the bottom of the flask of the apparatus or on the surface of the plates of magnesium. To render the precipitation complete, the liquids must be kept in a proper state of acidity, and the experiment prolonged till the new plates of magnesium introduced into the liquid dissolve, whilst retaining their metallic brilliancy. To ascertain the end of the operation, it is well to take out at first a small proportion of the liquid of the flask, to put it into a small test tube, and to introduce a well-scoured ribbon of magnesium. However it may be, it is always necessary to leave in the flask a small excess of magnesium before putting the liquid on a filter. All that is in suspension—corroded plates of magnesium, powder, flakes, or metallic sponge—is washed on the filter until the washings show no acid reaction; the filtered liquids should not precipitate on the addition of hydrosulphuric acid. The filter being dried, collect the deposit it contains, and analyze it in the ordinary way to ascertain the metals precipitated by the magnesium.

The limits of an article like this do not admit of the minute details of the operations of the experimentalist and the precautions he ought to take. These precautions and verifications belong to all analyses appertaining to legal chemistry, and every operator imagines, multiplies, and varies them according to the principles of the method he employs and the research he is engaged upon. Here we bring forward merely a note on the formation of solid hydride of arsenic, when the liquids contain nitric acid, and the necessity in the last case of preventing its formation by the addition of some particles of pure sugar candy, according to M. Blondlot's valuable recommendation. Again, we content ourselves with indicating that in a solution of bichloride of mercury the mercury is not all precipitated in a metallic state by the plates of magnesium; a portion forms a deposit of protochloride.

There is one more important observation, the omission of which would not fail to call forth criticism—the magnesium which contains silicium gives off on contact with acids siliciuretted hydrogen, which decomposes at a dull red heat like arseniuretted and antimoniuretted hydrogens, leaving a dark brown deposit. The formation of this deposit might give rise to an error. Such is the objection. A few words will answer it:—

1. The magnesium which is now manufactured gives no foreign deposit in Marsh's apparatus; no sample of magnesium ribbon (as it is made for burning) tested by us has given either rings or spots. The hydrogen it gives off has always appeared remarkably pure and inodorous; its flame is hardly visible.

2. Marsh's apparatus fed by magnesium is tested under precisely the same conditions as when fed by zinc. The suspected liquids are only introduced into the apparatus after the preliminary verification of the gas-producing agents.

3. The deposit of silicium left in the red-hot tube by the passage for the hydrogen, accidentally charged with siliciuretted hydrogen, is moreover clearly distinguishable from the deposits of arsenic and antimony.

These last two disappear immediately on contact with a drop of nitric acid or aqua regia; the ring and spot of arsenic disappear suddenly when touched with a diluted solution of a hypochlorite. These three tests have no effect on the deposits of silicium produced in the tube of the Marsh's apparatus.—*Lond. Chem. News*, July 20, 1866, from *Journ. de Pharmacie et de Chimie*, iii., 413.

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#### BOUSSINGAULT'S RESEARCHES ON THE ACTION OF FOLIAGE.

A full abstract of the first part of these investigations, communicated to the French Academy of Sciences, is given in the *Comptes Rendus*, vol. lx. No. 18 (May, 1865). Theodore Sausure had long ago ascertained that, while plants prosper and decompose carbonic acid gas in an atmosphere containing as much as one-twelfth or even one-eighth part of that gas, they promptly

perish in unmixed carbonic acid, apparently without decomposing any of it. Boussingault made his experiments in a better form, upon leaves only, avoiding all complication of the action of the roots or other parts of the plant. His results are :

1. That leaves exposed to sunshine in pure carbonic acid do not decompose this gas at all, or only with extreme slowness.

2. But in a mixture with atmospheric air, they decompose carbonic acid rapidly. The oxygen of the atmospheric air, however, appears to play no part.

3. Leaves decompose carbonic acid in sunshine as readily when this gas is mixed with nitrogen or with hydrogen.

Although this decomposition of carbonic acid by green foliage must be a case of dissociation,—a separation of carbon from oxygen,—yet Boussingault recognizes an analogy here with an opposite phenomenon, viz., with the slow combustion of phosphorus at the ordinary temperature. Phosphorus in pure oxygen emits no light, does not sensibly undergo combustion, but does so in a mixture of oxygen with atmospheric air, or with nitrogen, hydrogen, or carbonic acid. The analogy may even be carried farther. For while a stick of phosphorus is not phosphorescent in pure oxygen at ordinary or increased pressure, it becomes so in rarified oxygen. And Boussingault equally ascertained that leaves which exerted no sensible action upon pure carbonic acid at ordinary pressure, decomposed it, with the liberation of oxygen gas, under diminished pressure. That is, rarefaction and mixture with an inert gas act alike in mechanically separating the atoms, whether of carbonic acid as in the one case, or of oxygen as in the other, so as to determine the action either of combination or of dissociation.

In a continuation of these investigations (*Comptes Rendus*, vol. lxi. Sept. 25, 1865), Boussingault shows that carbonic oxide, whether pure or diluted, is not decomposable by foliage, and that this inertness of green foliage upon carbonic oxide goes to confirm the opinion maintained in his *Economie Rurale*, that leaves simultaneously decompose carbonic acid and water,  $\text{CO}_2$ ,  $\text{HO}=\text{CO}, \text{H}, \text{O}^2$ ; the  $\text{O}^2$  being liberated,  $\text{CO}, \text{H}$  expresses the relation under which carbon is united with the elements of water



in cellulose, starch, sugar, &c., i. e., in the important principles elaborated by the leaves, the composition of which is represented by carbon and water. He goes on to prove that a leaf which has been decomposing carbonic acid and water all day long is capable of doing the same work the next day, if not allowed to dry, but the losing of a certain amount of water annihilates this faculty, and irremediably destroys the life of the cells of a leaf, vegetable life in this state being far less tenacious than that of some of the lower animals (*Tardigrades*, *Notipes*, &c.), which bear wonderful desiccation.

The third instalment of the investigation is given in Nos. 16 and 17 of the same volume (Oct. 16 and 23, 1865). It appears that detached leaves, kept in shade for many days, with the cut end of the petiole in water to prevent desiccation, preserve the power of decomposing carbonic acid whenever brought into sunshine. But for this they must be kept in an atmosphere containing a supply of oxygen; without this they soon die, as Bous-singault thinks, from asphyxia. The oxygen in darkness is slowly transformed into carbonic acid, through an operation which is presumed to go on continually, whether in light or darkness, and to answer to respiration. Of course a healthy and active leaf decomposes far more carbonic acid in the light than it forms in darkness. In eighteen experiments, with Oleander-leaves exposed to the sun from 8 A. M. to 5 P. M., in an atmosphere rich in carbonic acid, a square meter of foliage decomposed on the average over a litre of carbonic acid per hour, while in darkness only  $\frac{7}{100}$  of a litre of carbonic acid was produced per hour. In air which contains oxygen and carbonic acid, leaves will go on indefinitely producing oxygen in the presence of carbonic acid, and carbonic acid in the presence of oxygen. But the latter, though relatively small in amount, seems to be necessary to the preservation of their vitality. In hydrogen, carburetted hydrogen, or nitrogen, as well as in pure carbonic acid, they soon lose their decomposing power, and die from the impossibility of respiration, i. e., are asphyxiated.

Leaves confined in a limited portion of atmospheric or other air over mercury lose the power of decomposing carbonic acid;

and the experiments pretty clearly show that they lose it through the deleterious action of the vapor of mercury. It is thought remarkable that the leaf does not under these circumstances at all lose the power of transforming oxygen into carbonic acid; but that is what we should expect, for the carbonic acid so evolved (whether its evolution be called respiration or not) must be a product of decomposition of the leaf's contents or substance.

We owe to Boussingault and his assistant Lewy the idea of determining the composition of the air contained in a fertile soil, and the fact that this air in a strongly manured soil contains a very large percentage of carbonic acid. Boussingault has now devised an experiment by which the air contained in a branch of an Oleander in full vegetation was extracted. It proved to be nitrogen 88.01 per cent., oxygen 6.64, carbonic acid 5.35 per cent.; being about the composition of the air from a well-manured soil. This carbonic acid carried into the leaves with the sap, and also that which they may absorb directly from the atmosphere, decomposed along with water under sunlight, must be the source of the glucose ( $C^{12}H^{12}O^{12}$ ) which it is the principal function of foliage to produce. This glucose, in fixing or abandoning the elements of water, becomes sugar, starch, cellulose, or other hydrates of carbon, which, in whatever part of the plant accumulated or deposited, and however transformed or re-transformed, must always have originated from carbonic acid and water in the green parts of plants. In closing his present paper with some illustrations of this now familiar view, Boussingault announces that his more recent experiments will enable him to demonstrate the direct formation of saccharine matter by the green parts of vegetables exposed to the light.

A. G.

—*Amer. Jour. Sci. and Arts*, July, 1866.

## BOTANY BAY, OR GRASS-TREE GUM.

By P. L. SIMMONDS, F.S.S.

This remarkable resin, which is known in different parts of Australia under various local names, as "black boy" gum, grass-tree gum, etc., would seem to be obtained from several species of *Xanthorrhœa*, of which there are six or seven well-defined species in Australia. The resin has long been known among druggists as gum acroides. It was generically named by Swartz from its peculiar color.

This resin was first described in Governor Phillip's voyage to New South Wales in 1788. Mr. Phillips states that it was employed by the natives and first settlers as a medicine in cases of diarrhœa. The resin of *X. hastilis* as it occurs in commerce sometimes forms masses of considerable size; but as it is very brittle, although tolerably hard, it usually arrives in small pieces, and in the state of a coarse powder. Its color is a deep yellow, with a slightly reddish shade, and considerably resembling gamboge, but darker and less pleasing. The color of its powder is greenish-yellow. When chewed it does not dissolve or stick to the teeth, but tastes slightly astringent and aromatic, like storax or benzoin. When gently heated it melts, and when strongly heated it burns with a smoky flame, and emits a fragrant odor resembling balsam of tolu, containing apparently cinnamic acid mixed with a very little benzoic. The quantity of carbazotic acid which this resin yields when treated with nitric acid is very great, and it is easily purified. Incidental mention has already been made of this resin, ("Technologist," vol. ii. p. 25; iii. p. 19; and v. p. 227), but as it appears to be occupying increased attention in Australia just now, some further details respecting it may prove useful.

The grass-tree is one great characteristic of the scenery and of the vegetation of Australia. It puts one in mind of a tall black native with a spear in his hand ornamented with a tuft of rushes. On the spear is found an excellent, clear, transparent gum, and from the lowest part of the tree oozes a black gum, which makes a powerful cement, used by the natives for fastening stone heads on their hammers. The resin may be obtained in

inexhaustible quantities. *X. hastilis*, *australis* and *arborea* seem to be the most generally diffused species.

A late Melbourne paper thus speaks of the tree :—"There are few who have ever travelled any distance in Victoria but have met with the grass-tree, which is to be found in nearly all parts of Australia. Up to a few months ago it was supposed only to be a useless growth encumbering the land. A few knew from the natives that it contained a very tenacious gum. The blacks used it as a glue for joining parts of their weapons, but it is only within the last few months that the following valuable articles have been obtained, after great labor and expense, by a Mr. Dodd, St. Romain's. The place where Mr. Dodd has erected his works to carry on the experiments is situated about eighteen miles in a southerly direction from Colac, and here for some months past experiments have been carried on in connection with the grass-tree. The root is the portion used in these experiments, and usually weighs from 10 lb. to 50 lb. The root is composed of the stems growing in a close mass around the inner portion or kernel. From the outer portion gum shellac in large quantities is obtainable; the refuse contains a large quantity of gas, and can be made available for lighting the works. From the inner portion is extracted, by pressing and distilling, a spirit equal to the best brandy; after distilling, a quantity of saccharine matter remains, from which sugar can be extracted. The present supply of grass-tree in the neighborhood of St. Romain's is computed to be equal to a supply of 600 tons per week for the next ten years. Great quantities of young grass-trees abound, which will keep up the supply, and doubtless cultivation will enlarge the roots."

In a paper which we read before the Society of Arts, in 1855, "On the Gums and Resins of Commerce," we entered rather fully into the character and uses of this resin. We therein stated that Captain Wray, R.E., submitted a report to the local authorities of Western Australia in 1854, on the manufacture of illuminating gas from the *Xanthorrhœa* at one-third the expense of lighting with oil or candles.

The plant grows in abundance all over Western Australia, and is composed of a core of hard, fibrous pith, about half of its

whole diameter, around which there is a layer of resin, varying from half an inch to one inch or more in thickness, which forms the connection between the leaves and the core. Between these leaves and also adhering to, and covering them, is a considerable quantity of resin; resin also exudes in large lumps from the sides of the plant.

The method of obtaining the material in the colony for this purpose was as follows:—In the first instance, the leaves and resin were separated from the core by breaking up this plant with an axe and sifting the resin from the leaves; but it was found by experience that as much gas was obtained from an equal weight of the leaves and resin together, as from the resin alone. The quantity of resin obtained from an average-sized "black boy" was about 45 lb. weight. This was collected easily at the rate of 5 lbs. per hour, by a person having for his tools an axe and a sieve.

Should the resin be collected for export, I am satisfied that by a proper arrangement of crushers and sieves, a laborer, at 4s. per diem, (the colonial rate), could collect at least one hundred weight per diem, enabling the resin to be brought to market at Freemantle for £4 per ton, the ton weight measuring forty-five cubic feet when pressed. The quantity of pure gas obtained by Captain Wray's experiments was at least four cubic feet to the pound of resin and leaves, but much more might be obtained by a more complete apparatus.

A cart-load of the plants, eight in number, weighed 1,048 pounds. When the core was removed, the leaves and resin weighed 628 pounds. This core is very good fuel when mixed with other wood. The specific gravity of the gas is .888. The products of the distillation are gas, tar and coke. The tar obtained was about one quart for every 10 lb., and this, when redistilled, gave 8 per cent. fluid oz. of naphtha, and 20 per cent. of a sweet, spirituous, non-inflammable liquor. The coke remaining was about one-quarter of the original weight, and with other fuel burns well. The coke of the leaf has a bright shining appearance, and when ground with oil, is a very good substitute for lamp-black in paint. The gas has a smell somewhat similar to coal gas, not nearly so offensive, but sufficiently strong to

make any escape immediately perceptible. Its illuminating power appears to be very superior to coal gas, and its light very white.

Captain Wray is of opinion that when the production of the gas from the resin of the *Xanthorrhœa* is conducted with suitable apparatus, the cost per annum will be materially reduced, so far, indeed, that the resin may become a large and profitable export from the colony, to places which are not lighted at all, or lighted with oil. The supply is almost unlimited; and even were it not so, it would be advantageous to get rid of the plant from all the land for cultivation. Should it be found, however, that the plant was likely to get scarce, the resin might be obtained by tapping.—*Lond. Pharm. Journ.*, August, 1866, from *The Technologist*.

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#### THE USES OF SULPHUROUS ACID GAS.

For many months Dr. Dewar, of Kirkcaldy, has been engaged in impressing upon the Government, the public, and the profession, the importance of employing the fumes of sulphur in the prevention and cure of disease, and quite recently he has extended their use in a different and scarcely less important direction—the preservation of animal food. Without accepting his views of the nature of disease—pointing, as he seems to indicate, to the origin of all disease from cryptogamic spores—as at all correct, we may nevertheless state that he has arrived at several interesting and remarkable practical results. Dr. Dewar's experiments were at first initiated in connection with cattle plague, and his method of fumigating byres is to take a chafer two-thirds full of red cinders, place a crucible in them, and in it a piece of sulphur stick the length of one's thumb, which is sufficient for a byre containing six cattle. If ordinary attention be paid to ventilation, the attendant may shut himself in along with the cattle during the process, not only without detriment, but, as we shall presently see, with occasionally unlooked-for benefit. This process may be repeated four times a day, and the result has been that, when this system has been thoroughly and determinedly practised, there has been no case of death among the cattle from any epidemic cause whatever. Nor

has this been the sole result. Ringworm, angle-berries, (*molluscum*), mange, and lice have disappeared; and a horse which had been a few times unintentionally fumigated, was unexpectedly cured of obstinate grease of the heels. Nay more, in a large dairy, which for thirty years had maintained a notorious character for mortality from pleuropneumonia, and the present tenant of which had for eight years past never been one whole month free from this disease amongst his cattle up to the 1st of November last, and had buried sixteen cows during the preceding twelve months, the last of them only three days before he began to fumigate, this disease has since then ceased to be observed, and the cows have remained perfectly healthy. These facts are extremely remarkable, and of themselves would compel a further investigation of the influence of sulphurous acid fumes; but what we have still to relate is still more extraordinary, and could scarcely be believed but upon the testimony of an upright and honorable medical man, such as we know Dr. Dewar to be. For not only were chilblains and chapped hands found to disappear from the hands of the attendants upon those cattle which were regularly fumigated, but in the case of a groom of Dr. Dewar, supposed to be dying from phthisis, and who was employed to fumigate certain cattle, the most extraordinary results were attained; for within one week the night sweats had ceased, his cough gradually abated, the expectoration diminished, and he gained nearly two stone within four months, and though now dependent for existence upon one lung or little more, he looks nearly as strong and is as able for ordinary stable work as he was previous to his illness.

This case has been observed by Professor Sir J. Y. Simpson, by Dr. Halliday Douglas, and by other medical men, who are conversant with the facts. Indeed, so remarkable and encouraging have the results obtained in this and in several other similar cases appeared to Dr. Halliday Douglas, that he had determined to construct a chamber for the purpose of employing sulphur fumigation in connection with the Chalmers Hospital, that he may have an opportunity of personally investigating the matter and testing the results. It is truly somewhat singular, and peculiarly illustrative of the circular—or shall we rather say

spiral—manner in which medicine moves, or, if you will, progresses, though its progression is limited, and as yet not well defined, that Hahnemann was led by his theory of disease to propound sulphur as the most important remedy in tuberculosis, while Dr. Dewar, from the success of sulphur in its treatment, has been apparently led to deduce its origin from cryptogamic sporules—a closely similar theory. With theories, however, there is at present no need of troubling ourselves; the practical results are sufficiently striking to ensure for this treatment a more careful and extensive trial. In diphtheria and various other complaints sulphur fumigation has proved immediately and strikingly beneficial; and in at least one instance it has almost instantly cut short an outbreak of hospital gangrene in the wards of our Edinburgh Infirmary, and, properly employed, it may possibly prove capable of limiting the spread of cholera, fever, and other contagious diseases. For the disinfection of inanimate material the addition of a little nitre to the sulphur, and the combination of these fumes with the steam of boiling water, improvises a disinfectant at once the most powerful, most searching, and most efficacious which can be obtained, utterly destructive at once of any latent contagion, and of every form of insect life. But we have not yet exhausted all the strange properties of sulphur fumigations: it is not only productive of animal health while in life, but it also prevents putrefaction after death. In some recent experiments (in June weather) in regard to this, a sheep's head was kept quite fresh and sweet for thirteen days; a boiled crab—well known to be a peculiarly perishable edible—was quite sound after eight days; haddocks, after being smoked two or three times, were found to be quite fresh at the end of eight days. The process is equally applicable to every other form of animal food, which merely requires to be fumigated three or four times a day in a chamber closed as much as possible against the admission of fresh air. At a convivial entertainment recently given by Dr. Dewar, the company were entertained with viands thus preserved, and one and all expressed their perfect satisfaction with the success of the process, as evinced by the satisfactory condition of the food presented to them.

How novel and strictly original Dr. Dewar's views are as to



the pleasantly tonic virtues of sulphur fumigations may be learned from a statement in the most recent work on *Materia Medica*, Dr. Scoresby-Jackson's "Note-Book," where he states that in sulphur fumigations "great care must be taken to protect the respiratory organs from the fumes by closing the apparatus round the neck;" and yet how inconsistent these ordinary views are with popular experience may be learned from the popular idea of the great benefit to be derived from new flannel, that is, flannel thoroughly impregnated with sulphur fumes, and also with the fact that in woollen mills, in certain departments of them, the workmen live from year's end to year's end in an atmosphere thoroughly impregnated with sulphurous acid gas. Unquestionably a laborious and tedious accumulation of experience in regard to the positive influence of sulphur fumes upon the health may be anticipated by an inquiry into the ordinary condition of such workmen; and we shall feel obliged if any of our readers shall be kind enough to contribute any information on this head, similar to that which was contributed to the "Monthly Journal," by Dr. Thomson, of Perth, in regard to the influence of an atmosphere charged with oil. It would indeed prove singular if, after all, the benefit supposed to be derived from oil was solely due to sulphur.—*Lond. Pharm. Journ.*, August, 1866, from *London Medical Press and Circular*.

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#### SOLUBILITY OF PARAFFINE.

August Vogel has determined the solubility of paraffine in benzole, chloroform and sulphide of carbon. The paraffine experimented with melted at  $48^{\circ}$  C., and congealed at  $45^{\circ}$ . The benzole had the specific gravity 0.887. One part of the benzole at  $46^{\circ}$  C. dissolved 7.7 parts of paraffine; at  $43^{\circ}$  5.0 do.; at  $39^{\circ}$  4.0 do.; at  $23^{\circ}$  0.7 do.; at  $20^{\circ}$  0.3 do.

*Solubility in Chloroform.*—One part of chloroform at  $23^{\circ}$  dissolved 0.22 parts paraffine. One part of chloroform at  $20^{\circ}$  dissolved 0.16 parts paraffine.

*Solubility in Sulphide of Carbon.*—One part of sulphide of carbon at  $23^{\circ}$  dissolved an equal weight of paraffine.

Comparative experiments with stearic acid showed that one

part of benzole at  $23^{\circ}$  C. dissolved 0.22 parts of stearic acid; and one part of sulphide of carbon at  $23^{\circ}$  dissolved 0.3 of stearic acid. This acid is consequently less soluble in the above menstrua than paraffine. A mixture of stearic acid and paraffine fused together did not separate from these solutions in a homogeneous mass, but in two layers, the stearic acid appearing in distinct crystals. This may suggest a method of recognizing the presence of stearic acid in a mixture with paraffine—*Druggists' Circular*, June, 1866.

## Varieties.

*Alkaloid in Arnica*.—According to M. Hesse, the alkaloid discovered in arnica flowers by M. Peretti, by distilling them with caustic potassa, is but a mixture of ammonia and trimethylamina in solution in water. [Does not this infer the existence of a natural alkaloid decomposed by the action of potassa?—ED. AM. JOUR. PHARM.]—*Jour. de Pharm. Avril*, 1864.

*Narceia*.—M. Hesse (*Ann. der Chem. und Pharm.*) makes the following statement in regard to this hitherto illy known substance of opium: At  $293^{\circ}$  F. narceia enters into fusion, colors slightly yellow, and by cooling concretes. At a more elevated temperature it emits alkaline vapors having the odor of pickle, and takes a brown color. It cedes to water after this a little of a substance which colors it blue, and which is insoluble in ether.

It is soluble in boiling water, in alcohol, and in hot weak acetic acid, and requires, at  $66^{\circ}$  F., 1285 parts of water, 945 parts of alcohol 80 per cent., and 800 parts diluted acetic acid. Heated with  $\text{SO}^3$ ,  $\text{HO}$  it becomes black, and not green as stated. At ebullition narceia dissolves easily in diluted sulphuric acid, and crystallizes in prisms afterwards, in the state of sulphate, which are slowly decomposed in the presence of cold water,—a change which is instantaneous by aid of heat.

The picrate is formed directly; it is a yellow oily matter, soluble in hot water. The tannate is in grey flocks, only slightly soluble in water. Bichloride of mercury forms in a concentrated solution of hydrochlorate of narceia an oleaginous precipitate, which becomes crystalline in the form of short prisms, insoluble in  $\text{SO}^3$ ,  $\text{HO}$ , and but little soluble in hydrochloric acid and in boiling water.

Similar compounds are found with bichloride of platinum and of gold.

The analytical results obtained by the author confirm the formula  $C^{46}H^{29}NO^{18}$ , found previously by Anderson.—*Jour. de Pharm.*, Avril, 1864—367.

*Preservation of Chloroform.*—According to M. Boettger, chloroform which has been altered by the action of the sun's rays, and contains hydrochloric acid and a chlorinous odor, may be restored and rendered fit for use for inhalation by agitation with a few fragments of caustic soda. It may be kept exposed to the light in the presence of some fragments of caustic soda.—*Jour. de Pharm.*, Avril, 1864.

*Dandelion Root.*—According to M. Vogl, the intercellular substance of taraxacum root is composed in greater part of a pectose, the same as found in green fruits. This substance is not the result of secretion, but of the metamorphosis of the substance of the cellular membranes. This metamorphosis is produced outside and inside.

The lactiferous vessels are connected with this metamorphosis. They are very numerous in this root, which they envelope in a very fine network; and it is at the expense of the cellulose of certain of these vessels that the pectose is formed, according to the author.

*American Opium Cultivation.*—The species of poppy from which opium is obtained is indigenous in northern Mexico. According to the report of Major Duffield, United States Marshal in Arizona, this plant is also found growing in its natural wild state in the valley of the Santa Cruz River.

Mr. Emanuel Weiss, of Pennsylvania, has recently visited the regions where the poppy is found, for the purpose of examining the country with reference to its availability for opium culture. In a circular which he has just issued, he exhibits the China trade with England and the United States, from which it appears that the British Government exchanges opium with the Chinese for tea, and transfers a large quantity of the latter article to the United States, for which we pay in gold. It is stated in this circular that two families, with but two able field-hands, can put ten acres of poppies under cultivation, which will yield about 1200 pounds of merchantable opium, containing nearly ten per cent. of morphia. The poppy matures rapidly, and is harvested within one hundred days from the date of planting. The greater part of the year could, therefore, be employed in the production of other crops, in stock-growing, or in mining operations, for either of which the Territory of Arizona affords ample facilities.—*Phila. Med. and Surg. Reporter*, July 21, 1866.

[NOTE.—If the *Papaver somniferum* does exist in the locality named it has probably been introduced, and is hardly indigenous. We believe the statement relative to the ease with which 1200 lbs. of opium may be grown and prepared for market, is calculated to mislead. For some facts on the culture of the poppy and the gathering of the opium, see Vol. xxxiv. p. 118 of this Journal.—ED. AM. JOUR. PHARM.]

*The Preservation of Lemons.*—SIR: I have for some time adopted a plan of securing fresh lemon-juice at all seasons of the year, by the very simple process of varnishing lemons with a solution of shellac in spirits of wine. As an experiment, I kept a lemon many months in this way; and as lemons unprotected from external moisture are prone to decay, and the juice to deteriorate, I quite believe I have discovered a very simple, inexpensive process, by which the medical profession can secure lemons during the season of plenty, and lay up with a little care a store of fresh lemon-juice for the feverish patient at all seasons of the year.

To the housewife who desires to use the peel for flavoring, by simply kneading the elastic lemons in the hands, the skin of shellac readily peels off, and leaves the rind quite unimpaired.

I am your obedient servant,

GEORGE MEE.

8, Torrington Place, Gordon Square. W. C.,  
8th June, 1866.

—*Lond. Pharm. Jour.*, July, 1866.

*Chlorate of Quinine.*—Mr. C. R. C. Tichborne, having been requested by Dr. Lyons to prepare him some pure chlorate of quinine, found that this salt could be best prepared from chlorate of barium. He describes its characters as follows:—When crystallized from a watery solution it forms small mushroom-shaped masses, which, on examination, are found to consist of filiform snowy-white crystals radiating from a centre. Crystallized from a spirituous solution, it resembles more the ordinary salts of quinine in appearance. Heated gently upon a spatula, it gradually melts, and after a little time goes off with a vivid combustion, which, if the salt is dry, sometimes amounts to an explosion. A carbonaceous residue is left. Treated with hydrochloric acid and gently warmed, it evolves chlorine copiously, which may be recognized by its smell. On adding ammonia in excess to this mixture an emerald-green color is developed. It is very soluble in boiling water, but rather insoluble in cold. When pure, it crystallizes with difficulty from this solution, but much more readily if it contains traces of any of the ordinary salts of quinine.—*Lond. Pharm. Jour.*, August, 1866.

*Formation of Nitrite of Potash.*—M. Wöhler states that when ammonia is decomposed by permanganate of potash, the disengagement of nitrogen is very feeble; and if the liquid be filtered after decolorization, the presence of nitrite of potash in it may be demonstrated by the evolution of nitrous vapors on the addition of sulphuric acid.—*London Pharm. Journal*, August, 1866.

*Anti-actinic Paper.*—Obernetter mixes an acid solution of sulphate of quinine with some gum or dextrine, and paints the mixture over a thin

sheet of white paper. With this he covers the window panes, and he states that on the brightest day a window so prepared will allow no actinic light to pass.—*London Chem. News*, Jan. 5, 1866, from *Berlin Photograph. Mitheil*, No. 16, 1865.

*To Clean Tarnished Silver.*—Wash the silver over with a strong solution of cyanide of potassium. Simultaneously with the development of a very disagreeable smelling gas, the metal becomes bright, and must be immediately washed with water and dried.—*London Chem. News*, Jan. 5, 1866, from *Erdmann's Journal*.

## Editorial Department.

THE LATE MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.—

In accordance with the arrangements the Association convened at the farthest point west and north at which it has yet assembled,—Detroit. There were more Western members present than at any previous gathering, and the meeting was in all respects successful. The greatest drawback that occurred was the absence of delegations from Baltimore, Cincinnati, and St. Louis. The delegates of the two latter colleges were absent from the severity of epidemic cholera prevailing, requiring every one to be at his post. Why Baltimore was unrepresented has not transpired. For the details of the sessions, of which there were five, we refer our readers to the minutes of proceedings in the first part of this number. The volunteer papers were quite numerous, which was fortunate, as the replies to the regular queries were unusually deficient. This want of promptness in contributing papers that are accepted is an evil for which a remedy should early be sought. It arises from the manner in which, to this time, the acceptance of subjects has been hurriedly obtained during the latter sessions of the meetings. It would be better that the Committee on Queries endeavor to get their report perfected sufficiently early to communicate with members before the meeting, so that members can reflect a little before accepting a subject, or, if preferred, volunteer a subject they are willing to write upon, which can then be incorporated in the report. The reception of the Convention by the Pharmacutists and Druggists of Detroit was in every way agreeable and comfortable. The place of meeting has never been surpassed for comfort and convenience, and the petty conveniences which go so much to give real satisfaction in a gathering as little bound by parliamentary usage as is ours, were abundantly provided and availed of by the members.

Before the adjournment of the first session printed invitations were privately handed to the members, from Mr. Stearns, to a Conversation at the

parlor of the Russell House, at 8 o'clock, P. M., so that the social element, in which the ladies form so important a part, and which has added so much to the satisfaction of the meetings of latter years, was early introduced, rendering the sojourn of the visiting members who brought their wives much more agreeable, and making acquaintances more thorough and lasting than would have arisen from half a dozen sessions. As the evening progressed an elegant entertainment was found to be part of the programme, which was partaken of by all with zest and good feeling, and this was followed by some excellent music, vocal and instrumental, from members of the party. On Friday morning, at the adjournment of the fourth session, the members, by previous arrangement, were invited to meet the Druggists and Pharmacentists of Detroit, at 2 o'clock P. M., on the Steamer Morning Star, for an excursion down the river to Lake Erie and return. The boat was large and commodious, the company about two hundred in number, many of whom were ladies. An excellent band of music was provided, and all seemed thoroughly to enjoy the occasion, strangers and citizens. As the boat glided down the noble river, the various objects of interest on either side, factories, country seats, villages, old forts, etc., were pointed out; the weather was fine, the band added their quota, and all went smoothly and joyously along until we rounded to return, when other movements, which had been quietly in progress while the company were engaged with the scenery, culminated in an invitation to partake of the burden of a long, elegantly arranged table, groaning with varied viands, fruits and comfits. All seemed ready for the discussion; all seemed to enjoy themselves and each other; and when the boat approached the city they adjourned to view its river front, as having passed the point of starting she rounded in view of Presque Isle and slowly returned to the landing, while the band sent forth "Home, Sweet Home."

Late in the evening, after the adjournment, a number of members were congregated in the rotunda of the Hotel; they were about to depart to their distant homes by radii of travel varying from 200 to 1000 miles east, west or south; some by the night trains, others in the morning. Suddenly, as by one accord, the idea of "*Auld lang syne*" seized on the group, and, joining hands in a circle of twenty feet diameter, the heart-stirring tones of the old song were brought out with an emphasis and feeling that will long be remembered by the actors in that spontaneous effort of parting friendship.

An invitation received from the New York College of Pharmacy, determined the place of meeting for 1867 to be New York; and the time was made agreeable to the Western members,—the second Tuesday of the month of September.

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PHARMACY IN SPANISH AMERICA.—Whilst watching the progress of Pharmacy at home, and recording its developments in Europe, it is pleasant to be reminded that our professional brethren in Buenos Ayres and

Cuba are advancing their art and opening schools for the culture of the sciences it involves. On another occasion we have referred to the "*Revista Farmaceutica*" as a Journal of Pharmacy, published in Buenos Ayres, in the Spanish language, and printed some extracts from it. In the present number (page 412), is a short review of a work on Pharmacy by Charles Murray, Professor of Pharmacy at Buenos Ayres and Honorary Member of the Philadelphia College of Pharmacy, which does great credit to the author, and is remarkable as the first book on our science which has been published in that region of the globe.

We have recently received from Mr. Figueroa, of Cartagena, Cuba, a package of numbers of a pharmaceutical Journal published in Havana, Cuba, and now in its fourth year, called "*La Emulacion*," devoted to Pharmacy and the applied sciences, published under the direction of Drs. Joaquin F. de Aenlle and Fernando Valdes y Aguérre.

The first number contains, 1st, a criticism on the regulation of the government appointing drug inspectors.

2d. An extract from a pamphlet by Prof. Casaña, of Barcelona, on reforms in the mode of teaching Pharmacy.

3d. Regulations of the University of Havana in regard to its faculty of Pharmacy, Cabinets, Laboratory, and Botanical Garden.

4th. Instructions to the sub-commissioners of Pharmacy, prepared by the Royal Academy of the Medical Sciences, and offered to the civil authorities for their approval and enforcement. These instructions are designed to bring all the dealers in medicines under official scrutiny, prepared with a view to correcting abuses and establishing a system of governmental inspection over all the pharmacutists in the Island.

The February number contains an article on the requirements and qualifications of Drug Inspectors, and another on unqualified practitioners of Pharmacy, including some letters from students of the University, complaining that whilst they are required to pass four years in study at great expense, ignorant persons are engaged in the practice under false colors.

In this number there is a short account of the conferring the degree of Doctor in Pharmacy on Don Justo Rafael Figueroa, who was complimented for his proficiency, and his preceptor took occasion to remark that he had graduated in Philadelphia. Advantage was taken of the occasion to remark that many of the titles proceeding from the United States could not and should not be accepted by their University; some on account of bad organization of the Schools which bestow them, and others because diplomas are granted without having undergone any studies; yet it was admitted that Colleges did exist, equipped in accordance with modern improvements in teaching, which compare favorably with European institutions.

The March number contains directions for detecting the poisonous alkaloïds, and an account of poisoning by the external use of nitrate of mercury.

The other numbers contain an article on the sale of secret remedies ; on chloroform for detecting bile in the urine ; and a series of articles on the mineral waters of Cuba. No. 42 contains a project for a benevolent fund association of physicians and pharmacutists, for the relief of members distressed by age, infirmities, or unmerited disgrace ; and for the widows and sons of deceased members left without means.

The last number received, that for June, embraces a number of analyses of saline waters from various parts of Cuba, several professional articles, and some observations on articles of the *Materia Medica*.

The earnestness with which the editors advocate reform will doubtless produce its effect, and we do not doubt but that many evils that have become chronic in the Island, will disappear before an improved education and legal restraint on quackery and trade in drugs.

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RECOGNITION OF BLOOD IN MEDICO-LEGAL INVESTIGATIONS.—The importance of a means of recognizing human blood from that of other mammals is very apparent, but is a problem that does not appear to be well understood. Some years ago, Mr. Barreul, a chemist of Paris, became so skilled in the recognition of animal blood by the agency of chemical action in connection with his unusual acuteness of the sense of smell, that his testimony was taken in the Paris courts as positive evidence. We believe the process consisted in the addition of sulphuric acid to the blood, and the test consisted in the odor evolved during the heat resulting from the mixture. We don't recollect whether this ability to detect included dried blood or not, but remember that it detected unmixed blood with great certainty, the blood of each animal evolving a peculiar odor. We have been led to this subject by the following written testimony of Dr. Duffield, of Detroit, in a murder trial in that city some months ago, and published in the *Detroit Tribune* of July 17th, 1866.

JULY 16, 1866.

ALFRED RUSSELL, Esq. :

*Dear Sir,*—In accordance with instructions received, I have examined the blood stains upon the clothes and upon the boat seat sent up to Laboratory.

The pieces I took from the lining of the right coat sleeve near the wrist afforded evidence of blood. Sections cut from the left leg of the pantaloons (one above the knee, one about at the knee, and one near the bottom of the leg) afford also evidence of blood.

It was dried quite firmly on to the texture of the cloth, and must by its appearance been at least six weeks or two months old. On cutting out the pieces from the pantaloons and sleeve, I moistened them with pure glycerine and allowed them to remain six hours. I then pressed out the liquid, drop by drop, as I required to use it, on the glass slip for the microscope, and subjected it to inspection. The blood corpuscles appeared shrivelled and smaller than in fish blood, but still preserved their rounded form and were able to be recognized as the organic features of blood.

Blood corpuscles of an ox, cow, dog, or any of the mammalia can be recognized from one another only by their size. On examining fresh blood



of an ox and fresh human blood, the human blood will be found to contain the largest corpuscles, and can readily be recognized even on admixture with ox blood corpuscles, which are smaller; but when time has elapsed, and the blood completely dead on the texture of the cloth, the corpuscles become shrunken, and give, as regards their size, very uncertain results. In the present case, all the corpuscles were *round* (in the blood taken from the clothes), and therefore belonged to one class, viz.: the mammalia, *i. e.*, ox, dog, sheep, cat, etc. It could *not* belong to birds or fishes, as their corpuscles are oval.

The spots on the seat were covered over with the eggs of a fish, which I scraped away and came down to dark spots, which had penetrated the wood. I took off the particles of wood with a clean sharp knife and rasped them into a powder, and soaked this powder with glycerine for ten hours. On putting a few drops of the glycerine under the microscope I found abundant evidence of blood corpuscles, the round ones predominating. There were also oval ones, which could be either fish or bird blood.

On the conclusion of this investigation I am compelled, though having experimented more or less for six years on the blood of animals, fowls and fishes, to depose that when dried for any length of time and again moistened, great difficulty will be experienced in attempting to fix its origin by the size of its corpuscles.

SAMUEL P. DUFFIELD.

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THE SCHOOLS OF PHARMACY—SESSION 1866-67.—We believe the coming winter will be marked by larger classes and more than usually energetic progress in pharmaceutical teaching. The PHILADELPHIA COLLEGE promises to open with a large class, under favorable auspices, and aided by its numerous cabinets and the ability of its Faculty, we doubt not a favorable report to the College in March will be made. One of the chief difficulties that presents itself is to find employment for the young men who come to this city to attend the lectures during the winter season. Two motives urge them to seek employment: 1st, to gain the advantages of the practice of pharmacy as conducted in Philadelphia; and 2d, a means of support during their sojourn at the School. The New York College appointed a committee to aid in this work of seeking employment, and the effort might well be imitated here, as subsidiary to the advancement of our School of Pharmacy. We believe our Faculty don't do justice to the School in the matter of an annual prospectus. The brief notice which heretofore has been issued is entirely too modest to accord with the received usage of the Schools and the expectations of applicants. We are constantly written to for information in this form, and are compelled to send only this programme, or submit to the inconvenience of writing out a sheet full of answers to legitimate queries. We have in pamphlet form a prospectus from the New York College, of ten pages, and another from the St. Louis College, of fourteen pages, setting forth the merits of their several Schools. In both Schools botany is considered one of the branches taught, and at St. Louis it is conducted on a scale as a summer course not elsewhere reached among our Pharmaceutical Colleges. This branch, so

important to the pharmacist who claims thoroughness, is the one that has been found most difficult to gain the attention and interest of young men, and until it is made a summer course, and obligatory on all who graduate, it will never occupy the position it deserves in the curriculum of our Schools. There is material in every large city to support a College of Pharmacy, and although it is not probable that the pharmacists of every city will choose to assume the laborious task of building up a School of Pharmacy, yet there is no reason why every city and large town should not have a local Society of Pharmacy, organized with a view to the professional, scientific and social advancement of its members. "In union there is strength" is a political motto equally applicable to our profession. Under the fostering influence of such local unions, libraries of scientific books may grow up, the best journals of scientific literature in all collateral branches can be subscribed to,—forming a central reading room of science, where the members may meet for self-improvement on discussion. Under such an union the "rough corners of trade jealousy" are rubbed smooth, pharmacists are willing to act together for mutual protection or advancement, and the evils of an unhealthy and unrighteous competition are at least abated and controlled. Every such Association could send its delegates to the National Association, which would be all the more useful and dignified for resting on and in the Local Associations of the country from Maine to Louisiana.

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BRITISH PHARMACEUTICAL CONFERENCE.—We look with great interest for the results of this meeting, believing that they will be far more important than has heretofore been attained. The additional feature of an exhibition of objects relating to pharmacy was taken hold of so energetically that it probably proved to be a most important feature of the Convention, though really exterior to its regular channel of operations.

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*The Physician's Visiting List for 1867.* Philad. Lindsay & Blakiston. This useful annual has again made its appearance, and claims the attention of physicians. All who have used it will need it again, and those who have not should try its memory-assisting power.

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OBITUARY.—Died in Beaufort, S. C., on the 26th ult., LEWIS THOMPSON, printer, in the 59th year of his age. Mr. Thompson was the junior member of the late firm of Merrihew & Thompson, of this city, who have for more than a quarter of a century printed this Journal of Pharmacy, and for a long time the Proceedings and Journal of the Academy of Natural Sciences, in the proof reading of which he took an active and efficient part. He was a man of rare talent and sterling worth, and knowing him as such, we feel unwilling to let this number go to press without entering this record of the decease of a noble minded man and a useful citizen as a slight tribute of respect to his memory.

THE  
AMERICAN JOURNAL OF PHARMACY.

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NOVEMBER, 1866.  
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AN ESSAY ON SASSAFRAS OFFICINALE.\*

BY WILLIAM PROCTER, JR.

The Sassafras is in many respects one of the most interesting of American trees, but has attained its reputation rather from the medicinal qualities of its bark and roots, than from the stateliness of its proportions or the excellence of its timber.

Sassafras was discovered by the Spaniards early in the sixteenth century; Hernandes, in his account of the plants of New Mexico, describes it as occurring in the Province of Mechoacan, as early as 1538. The followers of De Soto also discovered it in Florida about the latter period; they called it cinnamon wood, from its odor, and hoped it would prove as valuable as the spice of Ceylon.

Sassafras was also described at an early period by the Jesuits and others in Canada, and by them introduced into France, and soon became generally known in Europe for its sudorific and alterative properties.

Sassafras is one of the most widely distributed trees of North America, being found in Canada, in all the United States east of the prairies beyond the Mississippi, and in Mexico. In the north beyond 42d degree of latitude near the Atlantic, it is only a shrub in size, but it exists as a tree in upper Canada 20 to 30 feet high. In the Middle States it attains, in favorable positions in good soil, a height of 30 to 40 feet, and a diameter of from 12 to 18 and even 24 inches, but such trees are now rare. Further south, especially in Virginia and Carolina, it attains a greater

\* Read at the meeting of the American Pharm. Association, Detroit, in answer to Query 18.

height and size. When it occurs in dense woods it often attains a great height, with a thin, almost vine-like trunk, owing to the strong necessity of light to the health of the foliage. When standing separately, in good soil, sassafras assumes a beautiful symmetrical form, being round headed, the foliage being almost wholly on the extremities of the branches or branchlets, which are exceedingly contorted, but radiating in all directions, and, where visible, contrasting their grayish-brown color with the rich foliage.

Sassafras was separated from *Laurus*, by *Nees v. Esenbeck*, and placed in a new genus, *Sassafras*. It belongs to the natural order *Lauraceæ*; it is diœcious, only the female flowering trees bearing fruit. The flowers appear early in May in Latitude 40° N., but much earlier at the south, and are one of the harbingers of spring. They are somewhat aromatic, and by some esteemed medicinal, have a greenish-yellow color, bloom in short racemes, several of which issue from the end of each flowering branch, around the leaf bud, and belong to *Enneandria monogynia* of the sexual system. The fruit is a drupe about the size of a pea, oval in shape, deep blue when mature, and supported on a red, cup-shaped pedicel that attains its color while the drupe is yet green. The drupe contains an acrid balsamic juice whilst in its immature state.

The leaves are the most beautiful feature of this tree, being deep rich green above and paler beneath, with well-marked prominent veins, three of which radiate from the petiole and form the central ribs of the trilobate leaves. On the old trees the leaves are darker than on young plants, and are more savory of sassafras, but less mucilaginous when chewed. They vary much in shape, the lobed full grown leaves being five to six and a half inches long by four inches wide. Some of the leaves are ovate lanceolate, at other times the terminal and only one lateral lobe are developed, and these various forms are nearly always found together in each terminal group of leaves. They are frequently attacked by insects, and at such points become reddish-brown or rust-colored. The young branches near the leaves have a greenish-brown color, whilst the new shoots are green, without any brown coloring matter. Branches from half an inch and upwards in diameter have a thin gray rugged epidermis, often spotted

with lichens, but immediately below this the reddish-brown color of the bark is apparent. The inner layers of the old bark are much lighter in color, whilst the new bark in contact with the alburnum is nearly white. On old trees the bark of the trunk is deeply corrugated and furrowed. Michaux says the color of the old bark is very much like that of cinchona, which is true of the red cinchona. The *wood* of sassafras is coarse grained, and when young is nearly white, but the heart wood of old trees has a reddish cast due to the deposition of more or less sassafrid in its cells. The root wood is nearly white in roots of four inches in diameter, easily split and in distinct annular rings. The live bark immediately in contact with the wood is nearly white or cream colored, fleshy and perfectly free from a trace of brown; it is nevertheless highly astringent and pungent to the taste. When, however, the air acts upon it but for a short time it rapidly colors reddish brown, and eventually assumes the hue of cinchona, a change due to the oxidation of its tannic acid.

The *wood* of sassafras when well seasoned possesses considerable ability to resist decay, due no doubt partly to the presence of a little volatile oil. It is used for posts and stakes, and the larger timber has occasionally been made into furniture; veneers of the knotty curled wood were some years ago much esteemed for fancy cabinet work. When the white young wood is dried with the sap in it, the exposed surfaces acquire a reddish tint. The heart wood is considerably darker than the alburnum, and it is said that a variety exists with the heart wood of a red color, but I am inclined to think this statement applies to the heart wood of the roots of trees cut for some years.

The *bark* of the trunk of sassafras is but slightly impregnated with volatile oil, which resides chiefly in the inner bark of the root along with much tannic acid; and this inner bark is the true medicinal part of the plant, although the United States Pharmacopœia simply directs the bark of the root. The British Pharmacopœia and other European authorities recognize the whole roots, bark and wood together.

The *pith* of the young succulent shoots is recognized in the officinal list of the United States Pharmacopœia, under the name "*Medulla Sassafras*." The uses of this portion are solely as a

demulcent. It should be collected in September or before the 15th of October, after which period it is not so well stored with mucilage, and is more apt to become discolored on drying than when extracted earlier. The mucilage of this pith is remarkably pure and free from irritating qualities and admirably adapted for collyria—taking the place of the quince mucilage of European practice. The fresh young leaves give out an abundance of mucilage to cold water, which, though not so pure as that from the pith, may be used for allaying the irritation of inflamed surfaces, in eczema, rhus poison, etc.

The proper period for gathering the bark is in the autumn after the fall of the leaves, until the spring before the sap rises. The volatile oil then appears to be concentrated in the radical part of the tree.

In the State of New Jersey, the usual position to find sassafras trees is in fence rows, and along the edge of wood lands, where the plants originate from seed dropped by the birds; but every neglected spot soon becomes planted with sassafras by the same cause, if the soil is not too closely covered with sod.

The *commerce* in sassafras involves more labor and capital in that part which relates to the production of the volatile oil, than in that of the bark and roots, and it is only where the tree occurs abundantly that the oil is sought. So far as I have been able to learn, the largest amount of oil is distilled within sixty miles of Baltimore, which is the principal depot for its commerce. Alpheus P. Sharp, of that city, (see Proc. Am. Pharm. Assoc., 1862,) estimated the quantity produced for several years prior to that date at from 15,000 to 20,000 pounds, a figure much reduced by the war. Considerable quantities are extracted in York and Lancaster Counties, in Pennsylvania, and probably much of this makes its way to Baltimore. In some parts of West New Jersey isolated distillers, some of whom are colored men, prosecute a small business in this line. Through the aid of my kind friend Charles A. Heinitsh, of Lancaster, Pa., the following facts were obtained relative to the manufacture of the oil in that county, from Mr. Abraham Murray and Mr. Peter W. Hart, who are engaged in the business. The first point to attain is the material. This consists of the roots of sassafras, large and

small, the other parts of the tree never being used, and, in fact, contain too little oil to pay for the labor of treatment. Persons owning lands with a sassafras wilderness (as it is called) upon them have the trees removed for firewood or timber, and allow the sassafras oil makers to have the stumps and roots without charge, as their removal is payment enough. The contract is cheerfully accepted by the distiller, who, for the mere expense of extracting the roots, provides his material. The labor required varies with the kind of soil and the lateness of the season, greatly increasing when frost or dry weather stiffens the soil. It is a well-ascertained fact that roots from the richest soils produce the most oil and the best bark. Mr. Murray says there are three kinds of oil—colorless, yellow and red—and that the red oil is produced from a different sort of sassafras from the yellow and white; further, that the red oil is always *yielded in larger quantity*, the yellow next, and the white least.

Another manufacturer of the oil, Peter W. Hart, of York Furnace, York County, Pa., writes as follows:—"I have distilled, this summer, nothing but white and yellow roots, making clear oil, using an iron boiler and lead worm; I have distilled the *red root* with copper boiler and copper worm, and the oil I made was red, and the yield no better than from the white and yellow roots, which averages about four pounds to ten bushels of chips. I distil the roots with the bark on, *but don't consider there is any oil in the bark; it is only in the wood; [!] the amount of time required to distil ten bushels of chips is from 12 to 14 hours. I cannot say how much water is distilled in the operation, and is not used over again. As to the color of the roots, I don't think there is any difference. I consider the best is one that is brittle, easily cut or split; though I consider the root don't yield as well from the 1st of May to the 1st of October. I prefer the stump [roots] that has been cut from three to five years or longer.*"

In a subsequent letter Mr. Hart reiterates that brittle roots yield more oil than tough, fibrous ones. In reference to the "red roots," he says there is a variety of sassafras which has a *red heart* similar to the red cedar, which, he supposes, will yield

red oil. It yields very abundantly, but not more than brittle roots of a yellow color.

Nevertheless, Mr. Hart, who distils all kinds of roots, gets only clear oil, which he attributes to using a lead worm, and not a copper one.

He further states that the woody part of the stump above ground, and the roots that become uncovered by soil, produce an oil of less specific gravity than the deeper roots, and that it generally passes off with the water.

I have not been able to get at the true meaning of these statements, owing to want of time to make further inquiry for explanation, but suppose that the red oil is produced from roots of old stumps yet containing the bark, whilst the white comes from the young woody parts alone, and the yellow from older recent roots. The sassafrid or red coloring matter of the bark does not communicate any color to the oil, even at the boiling temperature. Mr. J. J. Thomsen, of Baltimore, (see his Report on the Drug Market, Proceed. A. P. Assoc., 1864, page 202), alluding to this variation in the color of the oil, says:—"The color of the oil grades from white (colorless) to red; but this peculiarity does not affect the quality. The distillers say the color arises from two kinds of roots used in distilling, and that the color of the oil varies with the proportion used. They make no effort to separate the varieties, as the quantity of yield is *about the same*." I cannot reconcile these statements, and leave the question involved for future inquiry; repeating, however, that I believe the red roots are from old stumps, as I have seen roots several years old that were strongly odorous of sassafras, and of a deep red color.

Having obtained the roots and transported them to the place of manufacture, those intended to be barked are scraped with any dull instrument to remove the dead, spongy epidermis, which is darker-colored than the underlayers, and contains much grit even after washing. The true bark is then removed in short shavings with a drawing knife, avoiding, as much as possible, the removal of any of the woody portion. The care with which this simple operation is executed materially affects the commercial value of the bark. Mr. Thomsen says that of 30,000 pounds



of sassafras bark received in Baltimore in 1863, only 1000 pounds was of prime quality, the wholesale price varying from 9 to 15 and even 20 cents per pound for superior lots. When taken from vigorous roots, the bark is thick and succulent, and if dried in the shade without exposure to wet and damp it assumes a bright cinchona color, and its flavor is pungent and aromatic.

The woody portions of the barked roots, and those roots not thus treated, are now cut up into chips for distillation. The small distillers of New Jersey generally use old copper stills and direct heat, hence it is not unusual to notice such oil having an empyreumatic taint. Mr. Murray describes the following arrangement as that employed by him and others, which consists of a boiler, a large cylindrical wooden still tank, and a tub and worm refrigeratory. The boiler in his case is an old still, but any steam generator will answer. The tank is of a size suited to hold eleven bushels of chips above the diaphragm near the bottom. The steam enters below the diaphragm, and, rising through the chips, raises the temperature to  $212^{\circ}$ , after which it carries over the oil gradually into the worm, and is condensed. We understand from Mr. Hart that the distilled water is not used to supply the boiler, but presume that some gain would come from using it. A charge of eleven bushels of chips yields from *one* to *five* pounds of oil, according to the quality of the roots, or, in fact, according to the amount of bark on them.

*Lignum Sassafras*.—It has already been stated that roots of sassafras are the parts used on the continent of Europe, and in Guibourt, Lemery, Morelot and other French authors, reference is made to the wood as obtained from America. Pereira says, (Mat. Med., vol. ii. 406,) "*Sassafras wood (Lignum radiceis sassafras vel ligum sassafras)* occurs in the form of large stems or branches, frequently more or less covered with the bark. The wood is soft or spongy, light, of a grayish-reddish tint, and has a fragrant aromatic odor. It is usually sold cut up into chips—*sassafras chips*." Christison says, (Disp. Amer. Edit., p. 847,) "The parts used in medicine are the root, wood and flowers; but at present the bark and wood of the root constitute the only officinal parts employed in this country [Great Britain]. The root is imported in branchy pieces, the crown of which some-

times measures eight inches in diameter, and the bark is often partially stripped off." "The wood is dirty grayish-yellow, light, porous, and it possesses the same odor and taste as the bark, but more feebly."

With these preliminary statements in view, diligent inquiry was made in Philadelphia in regard to the commerce of sassafras root wood, and I could find no traces of it among our druggists, nor had they any knowledge of the root wood being exported. Knowing Baltimore to be a mart for the bark and oil, I applied to Mr. J. J. Thomsen, Druggist, of that city, who kindly took some pains to get at the truth, which he gives as follows:—"Sassafras root is brought to Baltimore from within a circuit of three hundred miles, of which Baltimore is the centre. The root is the only part used, and any portion of the tree below the soil is esteemed merchantable. The roots are extracted from the ground by the use of levers, and, as obtained in this manner, are brought to market with the wood and bark untouched, and portions of the soil clinging to them. If exposed long to the sun and rain, much of this impurity is washed from the roots, and in this respect the roots vary in value. The branch roots vary from half an inch to six inches in diameter, emanating from a crown or stump varying from ten to fifteen inches, and sometimes, though rarely, as much as two feet in diameter. It is not customary among the collectors to keep them protected from the weather, or to wash them. When purchased in this form by the shippers, the roots are generally placed under cover, where they lose very much in weight by drying. They are then cut into pieces as straight as possible, and formed so as to fill in between barrels, casks and hogsheads when shipped to Europe.

"One or two parcels have been cut up, similarly to dye woods, before exportation, but it did not prove profitable, and is discontinued. Sassafras bark is not exported from here to foreign parts, but is sent largely to New York and the Western States."

It is quite possible that some roots may enter foreign commerce *via* New York, but we have no knowledge of it. It is curious that this contribution to foreign commerce should have been so long unnoticed by American writers on *Materia Medica*.

## CHEMICAL HISTORY OF SASSAFRAS.

The *leaves* contain, principally, mucilage, green coloring matter, tannic acid and ligneous matter. By maceration in water this liquid becomes thick and ropy in consistence. The solution is precipitated by subacetate of lead, but not by alcohol, which mixes with it, forming a transparent mixture of syrupy consistence, a quality noticed in the mucilage of the pith.

The fruit in its ripe state has not been examined, because it has not been obtainable since being engaged with the subject. In its green state the drupe causes an acrid (almost caustic) impression in the throat when chewed and swallowed. It has not the odor of the bark, though somewhat aromatic. Macerated in alcohol after bruising it, a greenish-brown tincture is obtained. When this is evaporated spontaneously until most of the alcohol is dissipated, an oily or oleo-resinous substance separates in globules, which appears to be connected with the acrimony, but was not investigated for want of time.

*The Bark of the Root.*—The best published essay on the chemistry of sassafras bark is that of Dr. H. Reinsh, (Buch. Rep., 1846). In 1000 parts of the bark he found 90 of water; 8 of light and heavy volatile oil and camphoraceous matter; 8 of tallow-like matter; 50 of balsamic resin and wax; 92 of sassafrid; 58 of tannic acid; 68 of sassafrid tannin and gum; 6 of albumen; 30 of gum red coloring matter and salts; 289 of starch tannin, as taken up by potash solution; and 247 of woody fibre.

M. Reinsh found the light oil to pass first, and then the heavy. The former he thought to be most fragrant of sassafras.

The *sassafrid* is analogous to cinchonic red. It separates from the alcoholic tincture when it is poured into an excess of water, as a cinchona-colored precipitate which dries in a granular form like indigo. It has no odor, scarcely any taste, yields oxalic acid and other products by the action of  $\text{NO}^5$ , is very slightly soluble in cold water, more so if tannin is present, but readily soluble in boiling water. Ether dissolves it but slightly; the alkaline solutions dissolve it very freely, and form dark red brown liquids; the alkaline earths precipitate it in combination.

It is evidently a derivative of the tannic acid of the bark, and exists most largely in the exterior layers of the bark which have nearly lost their astringency.

The large proportion found by Reinsh proves that he not only analyzed dry old bark, but probably also that with the epidermis included. I have before alluded to the fact that the growing bark is nearly white; whilst the same bark, simply dried, becomes cinchona-colored exteriorly, and this change slowly extends through it. The following experiments were made:—A root of sassafras, four inches in diameter, was uncovered from soil. Four vials, one filled with pure glycerin, another with alcohol, a third with colorless fixed oil, and a fourth with water, were provided. The epidermis was quickly scraped off, and strips of the bark rapidly removed and introduced into the vials, so as to be completely covered with the several liquids, and before any change of color by atmospheric action had occurred. On standing a few days the alcohol had acquired quite a reddish color, which increased considerably with time. The glycerin was affected much more slowly, but gradually it was discolored throughout, extracting the tannin from the bark, and this in turn being discolored by the air acting on the surface. The bark in fixed oil was a long time intact, but at present it exhibits portions colored brown. The watery liquid rapidly colored, though not quite so soon as the alcoholic. Nitric acid applied to the fresh bark makes a brown spot, and liquor potassæ a dark brown one. Either of the solutions above noticed, except the oily one, are colored deep red brown by potassa. The solutions precipitate gelatin and tartar emetic, and are colored dark blackish-green by sesqui-chloride of iron. The alkaline solution, though dark-colored, affords but little precipitate with hydrochloric acid. It must be apparent from these results that sassafrid is, like cinchonic red, a derivative of tannic acid, and that sassafras tannin exists to a much greater extent in the fresh bark than in the dried commercial specimens. It must also be apparent that carefully-dried sassafras bark is no mean astringent with its 6 per cent. of tannin and 9 per cent. of sassafrid, and might be found useful in some forms of diarrhoea.

*Volatile Oil.*—Oil of sassafras varies in color from colorless to yellow and red. The New Jersey oil is generally light-colored and often colorless when recent, and often has water adherent to its surface from not having been filtered. The Pennsylvania and Maryland oil, as has been said, is red, yellow and white or colorless. Its taste is pungent and aromatic, being agreeable to most persons. Its specific gravity varies from 1.087 to 1.094, increasing somewhat by age, although by no means so easily affected as the oils of the orange or mint tribes. It is neutral to test paper, yet, according to E. S. Wayne, it acted on lead in the solder of a copper can, forming an insoluble compound. Mr. Wayne did not investigate the circumstances under which this supposed compound was formed, nor whether the organic portion of the compound was oil of sassafras or a derivative of it. According to St. Evre, it begins to boil at 239° F., then the boiling point rises to 440° F. In my own trial there was no preliminary ebullition, but long before boiling commenced the oil evaporated in great clouds of vapor. When the mercury approached 430° F., ebullition commenced pretty freely. Its frequent adulteration in Europe with oil of lavender, and perhaps turpentine, will account for the low boiling point of other observers. Its composition is  $C_{18}H_{10}O_4$  (St. Evre). When pure oil of sassafras is cooled by a freezing mixture, it deposits *sassafras camphor*, a crystalline stearoptene, which may be obtained by pressing the cooled oil in bibulous paper. Its specific gravity is 1.245. This body has the composition  $C_{29}H_{10}O_4$ , containing two equivalents more of carbon than the oil. It does not appear to be a derivative of the oil by oxidation. Oil of sassafras is rapidly oxidized by  $NO^5$  with the emission of flame, and  $SO^3,HO$  resinifies it, producing a deep red compound called sassarubrin by Dr. Hare. Chlorine and bromine both unite with it without disorganizing its constituents, the latter making a crystalline compound. Gaseous chlorine develops a compound having the composition of ordinary camphor.

Oil of sassafras is readily soluble in alcohol, ether, chloroform, and mixes with other fixed and volatile oils. Like oil of camphor, it is very penetrating and stimulating, being well

adapted for liniments, into many of which it enters; it is also used as a carminative.

In conclusion it may be remarked that sassafras is employed much more in domestic practice than by physicians. Its bark is used officinally in the compound decoction of sarsaparilla, its pith in mucilage sassafras, and its oil in troches of cubeb; but in many cases where the bark might be employed it is passed by. When finely powdered, the bark of sassafras is better than Peruvian bark for dentifrices, having its astringency and antiseptic power with the grateful aroma of the sassafras; besides its powder is very like cinchona in color. The alcoholic extract of the fresh bark is a deep red astringent substance, strongly aromatic and pungent. It is not improbable that other barks, as cinchona, may resemble sassafras in being nearly colorless when in a growing state and altering by the drying process. The writer believes he has somewhere seen this remarked of recent cinchona bark. It is probable that this change occurs in cinnamon bark during the process of drying, and possibly also in *Krameria* root. The actual changes that occur in this transformation of tannin is worthy of a closer study by organic chemists than they have yet given it.

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#### ON URTICA DIOICA (STINGING NETTLE).

BY BENJAMIN SHOEMAKER, JR.

(Extract from an Inaugural Essay.)

The object of the author in writing on this plant was to discover, if possible, upon what constituent the diuretic properties of the root depended. The plant is covered with minute tubular hairs, which transmit a poisonous fluid on being pressed. This fluid is said to be formic acid. The root is known to possess diuretic properties. An infusion of the root has been used by some physicians of this city with great success in cases of dropsy, and other diseases where a diuretic medicine was indicated. The author inferred that the diuretic power depended on a volatile principle.

One pound of the ground root was exhausted with water, and the infusion evaporated to a pint, during which a disagreeable

odor was given off at the beginning, but none toward the last. The fluid extract thus prepared had a syrupy consistence, and a dark brown color. This was tried in doses of a fluidounce without any perceptible diuretic effect, which led to the conclusion that the diuretic principle was lost or destroyed in the process of making.

A pound and a half of the bruised root was macerated in seven pints of alcohol (sp. gr. .835) for two weeks. The tincture when decanted had a light green color ; it was distilled till nearly all the alcohol was recovered ; and the residue, on being thrown into water, afforded a resinous precipitate. This was collected, further purified by solution in alcohol and evaporation, where a soft green resin was obtained, which possessed no diuretic power. The portion of precipitate left undissolved by the alcohol was treated by ether, which took up from it a brown resinous matter, that, when isolated, had no diuretic power.

The author then sought for the diuretic principle in the dregs of the root left by the alcohol, by putting it in a still with eight pints of water, and distilled first one pint, which was set aside on account of its being strongly alcoholic, and then four pints. Both distillates had a very disagreeable odor ; the alcoholic distillate had a greenish yellow color, and the aqueous was milky. The liquid remaining in the still had no active properties, but both the distillates were quite powerfully diuretic.

The author took the aqueous distillate in doses of two fluidounces, at intervals of half an hour, until he had taken half a pint. The effect of the medicine on the kidneys became evident after the second dose, and did not pass off until next morning. The alcoholic distillate, in doses of half a fluidounce, also had a diuretic action.

The author's reasons for believing the active principle to be a volatile oil, are, that it has a warm penetrating odor, made a clear solution in alcohol, and a milky mixture with water. Tannin and iodohydrargyrate of potassium did not give any indications of a volatile alkaloid. He did not pursue the subject further in this direction, but states that among the fixed principles of the root are starch, gum, albumen, lignin, sugar, and two resins.

## CYPRIPEDIUM PUBESCENS.

BY HENRY C. BLAIR.

(Extract from an Inaugural Essay.)

There are several species of *Cypripedium* found in the woodlands of the United States; the species *pubescens* is considered the most medicinal, and is introduced into the secondary list of the United States Pharmacopœia. It is an herbaceous plant, about one or two feet high, having a pubescent leafy stem. The leaves are also pubescent, ovate, narrow at the base, and about four or five inches long by two in breadth. The flower yellow, slipper-shaped,—and hence its common name of “ladies’ slipper,” or “moccasin plant.” The fruit is an oblong capsule, tapering at each end. It is found most abundantly in rich moist woods. The root is fibrous, like Valerian, and, as it, is used as an antispasmodic. [It has acquired the name of American Valerian, a very improper designation, which has caused it to be confounded with the true Valerian which is cultivated in this country.] )

The dried root of the shops has a small knotted head or caudex, with numerous fibres much thicker than *Serpentaria*, and about four inches long. The cortical portion is of a brownish color, the woody part being much lighter. It has a peculiar heavy penetrating and unpleasant odor, somewhat like that of Valerian, and a sweetish bitter persistent taste.

1. The author, in seeking for the volatile principle, subjected the root to distillation with water. The distillate was returned on a new portion of the root, and the cohobation continued until four portions had been used. The last distillate had a milky appearance, with a small portion of a light volatile oil floating on its surface. The distilled water possessed an acid reaction.

2. A portion of the root was exhausted by alcohol. The tincture was colored blue-black by sesqui-chloride of iron. The alcoholic extract treated with ether yielded, by evaporation, a bitter astringent resinous substance. Water removed its astringency, and when treated by charcoal its color became light yellow, the bitterness being retained.

When the alcoholic extract was washed with water, and the



tannin precipitated from the washings by gelatin in excess, the filtrate was colored black by sesqui-chloride of iron, which was decolorized by heat, indicating gallic acid. A *cold* aqueous infusion was found to contain glucose and gum, but no albumen. A decoction contained starch.

The ethereal extract of the root, purified by alcohol, charcoal, and water, had a light yellow color, a peculiar gutta-percha-like odor, and produced a burning sensation when placed on the tongue. It was *soluble* in chloroform, and burned with a greenish flame.

The ashes of the root contained salts of lime, potassa and magnesia.

In conclusion, it may be stated that *Cypripedium* was found to contain a volatile oil, a volatile acid, tannin, gallic acid, two resins, gum glucose, starch, and ligneous matter.

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#### ON CUNILA MARIANA (AMERICAN DITTANY).

BY PHILIP MILLEMAN, of Chicago.

(Extracted from an Inaugural Essay.)

This is a small indigenous perennial plant found growing on rocky, dry, shady hills and woods, from New England to Georgia and Arkansas, flowering through June, July, and sometimes to October. This plant, called also *stone mint* and *mountain dittany*, has both in its recent and dried state a very warm, pungent, spicy taste, analogous to that of *Monarda punctata*—a fact suggested to me by Prof. Procter—and the object of this thesis is to trace how far the analogy is borne out by experiment.

A quantity of the fresh herb was obtained in Chester County, Pa., where it grows in great abundance on and along the hills of that section. This was carefully garbled and sliced transversely. Five pounds were introduced into a tin still of ten gallons' capacity, and eight gallons of water added. Heat was applied until a gallon and a half of distillate had passed, on which floated three fluidrachms and a half of a reddish amber-colored volatile oil.

A comparison was instituted between this oil and that of *Monarda punctata*. Their color is very similar, being reddish amber-colored; but the oil of dittany, by exposure to light,

becomes clear light yellow. Its odor is of a delicate fragrant character, very closely resembling the oil of *Monarda*, making it in this respect somewhat difficult to distinguish them apart. The taste of oil of dittany is warm, pungent, and causes coughing. When rubbed on the skin it produces but a slight redness, which soon disappears. In doses of five or ten drops it acts as a carminative, and when 15 to 20 drops are taken diaphoresis follows.

Its specific gravity is .920; it is readily soluble in alcohol, ether and chloroform. Iodine decomposes it with white vapors, sulphuric acid reddens and decomposes it, nitric acid resinifies it, and hydrochloric acid decolorizes it, but on exposure the color returns.

A portion of the oil exposed in a watch glass until it evaporated left a small quantity of crystalline grains.

The author then made an examination of the dried herb, in which he found tannic acid, a trace of glucose, no vegetable albumen, gummy matter, no starch, but considerable extractive matter, a part of which was bitter and acid, and dark green resin. The ash contained salts of potassa, lime, magnesia, and iron.

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#### ON SANGUINARIA CANADENSIS.

By THOMAS M. NEWBOLD.

(Extracted from an Inaugural Essay.)

The author, after stating the condition of his subject as recited in the U. S. Dispensatory, in which three principles are described, viz., *sanguinaria*, by Dana, *porphyroxin*, by Riegel, and *pucine*, by Wayne, and probably *Chelidonic Acid*, says the main object of these experiments were to isolate the acid principle of the root. This he proposed to do by exhausting the root with a menstruum which would not disturb the chemical status of the alkaloids and acid or acids, and then by precipitating by ammonia to get the acid in combination with ammonia in the liquid filtered from the alkaloids, and then separating the acid as a lead salt, and the lead from this by hydrosulphuric acid.

In pursuance of this plan a pint of the officinal tincture was precipitated by aqua ammonia in slight excess; the precipitate

separated by a filter; the filtrate, still of a red color, was slightly heated to dispel the excess of ammonia and precipitated by acetate of lead. This precipitate was washed, suspended in water and decomposed by sulphuretted hydrogen. The filtrate, heated and filtered, had a slightly yellowish color, and on careful evaporation afforded a thick syrupy liquid of deep red color and sharp acid taste, reddening litmus paper, very soluble in water, partially in alcohol but insoluble in ether and chloroform. Treatment by alcohol and evaporation separated some extraneous matter, but the result contained no crystals.

A second experiment was made with four ounces of the root in coarse powder, which was exhausted by displacement with cold water. The infusion was treated by ammonia, acetate of lead and hydrosulphuric acid, as before, and on evaporation a similar red acid liquid was obtained, from which small acicular crystals deposited on cooling. These were separated, purified by alcohol and animal charcoal, and were re-obtained in nearly colorless fasciculate crystals. After purification only two grains were obtained. (1.) This substance had an acid reaction, was soft under the teeth and almost tasteless. (2.) Moderately heated on platinum foil it fused with effervescence, formed a red liquid, was inflamed and left a black residue dissipated by further heat. (3.) It was decomposed with orange fumes by weak nitric acid. (4.) Also by fuming nitric acid. (5.) The crystals dissolve in strong sulphuric acid without apparent change, but on adding a drop of nitric acid it changes to yellow with a pink edge, which is evanescent. (6.) Their aqueous solution was precipitated black by nitrate of silver. Several of these reactions are given by Lowig as characteristic of Chelidonic acid, but other characters do not agree with that substance. As by far the larger portion of the acid matter is not crystallizable, the author believes it to be a liquid non-volatile acid which he calls *Sanguinarinic acid*.

Further experiments are needed to determine its true character.

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#### OBSERVATIONS ON SOME PRODUCTIONS OF MEXICO.

By M. GUIBOUT.

[The author devotes twelve pages in the August number of

the Journal de Pharmacie to an account of some Mexican productions, which we propose to give a notice of in a condensed form. Ever since the French expedition to Mexico, occasional articles have appeared throwing light on the products of that country. M. Guibourt had received a little work on Mexican Materia Medica, published in 1832 by M. Cal, of Puebla, and had corresponded and inquired, but owes his ability to write the present memoir to an accidental visit to the Laboratory of the MM. Merck, of Darmstadt, in 1865, on the occasion of his attendance on the International Pharmaceutical Congress at Brunswick. These gentlemen exhibited a collection of Mexican drugs, received from M. Schaffner as early as 1851; that gentleman, who is a pharmacist and botanist, residing in that country, wrote to M. Guibourt in 1854, asking his opinion of a variety of productions that he was about sending him, and giving considerable information about them. The specimens never came to hand, and of course M. Guibourt could not give his opinion of them, and laid the letter of M. Schaffner aside, until his attention was recalled to it by his visit to M. Merck, which, in his communication, he offers as a reason why M. Schaffner was never replied to. We propose to notice the subject in a different order, placing the more important first.—EDITOR. AMER. JOUR. PHAR.]

#### CEVADILLA.

*Cébadilla* or *Cebolleja*, *Veratrum Sabadilla*, L. According to M. Cal, this plant grows in *Terra Caliente*, the hot region of Mexico. The root is acrid, and sternutatory as the seeds, and enters into the composition of the powders of Sandoval. The seeds are acrid and irritating; applied externally they cause inflammation of the skin, and taken internally they produce pain in the stomach, and vomiting. They are employed, however, to destroy lice, and for intestinal lumbrici, and have been prescribed for tænia, but it is needful to use great circumspection. In the letter of M. Schaffner (1854,) he criticises me for supposing that the *Veratrum sabadilla* of Retz did not grow in Mexico, and for this reason, that this plant could not yield the cavadilla of commerce. He announced that he had sent specimens (which I did not receive,) and closes his letter by a memoir

which he had presented to the Mexican Academy, and expressed a wish that it be published in France. It has already been explained how this memoir came to light, by a visit to M. Merck, from which the following extract is made:

“The *legitimate* cevadilla may be produced by the following plants, viz:

(A.) *Asagraea officinalis*, Lindley; *Veratrum officinale* of Schlechtendahl, *Schœnocaulon officinale* of H. Gray, *Sabadilla* of Orizaba, *cebadilla* or *cebolleja* of the inhabitants of tierra caliente of Vera Cruz.

(B.) *Veratrum Sabadilla*, Retz., Orfilea Desc., *sabadilla* or *cebadilla* of the Interior.

(C.) *Veratrum virescens*, } of Martens and Galeotti.  
(D.) *Asagraea tenuifolia*, }

I am certain that A and B furnish the true cevadilla; according to MM. Martens and Galeotti, C and D produce a similar fruit.

*Note.* According to me (Schaffner,) the new species C is only a variety of B, and D is a variety of A. They are very much alike, and the differential characters do not appear to be constant or well proven.

The plant A is very common in the hot country about Vera Cruz, and there is called *cebadilla* and *cebolleja*, as being the mother plant of these two products\*. It is this from which I have always exclusively received the capsules for sending to Vera Cruz for exportation to Europe.

To distinguish the capsules produced by A and B, I have found the following characteristic differences:

The *cebadilla* of *Asagraea* (A) has an elongated form, and is terminated by sharp divisions. It is of a greenish yellow color, coriaceous consistence, and retains sometimes at its base the oblong yellow petals. The *cebadilla* of *Veratrum* (B.) is rounder and the divisions are oval. The capsule and seeds have a deeper color, and the petals are purple colored.

Cevadilla is subject to falsification. The Indians sell to pharmaciens, besides the capsules of B, another product

\* I suppose that the fruit is called *cebadilla*, and the root *ceballeja*.—G.

which they also call *cebadilla*, and sell it alone or mixed with the *cevadilla* of *Veratrum*.

This false *cevadilla* is the capsule of two plants of the natural order Scrophulariaceæ, and genus *Chelone* L., or *Pentastemon* of L'héritier and Endlicher. I characterize them thus :

- |  |   |                             |
|--|---|-----------------------------|
| 1. <i>Filamento sterilis glabro.</i>   | } | <i>Pentastemon</i> Bentham. |
| <i>Chelone gentianoides</i> , H. B. K. |   |                             |
| 2. <i>Filamento superus barbato.</i>   |   |                             |
| <i>Chelone companulata</i> , Cav.      |   |                             |

"These two plants are very abundant on the plateau of Mexico. The difference most apparent which characterizes their capsules, is that they are naturally open, or that they separate easily into four regular parts, of which the two principal divide a second time into two parts; further, they have the hardness and consistence of horn. The true *cevadilla* presents always three divisions at the summit, and its capsule is much thinner and lighter.

"The seeds of the false *cevadilla* are much smaller and very numerous; those of the true *cevadilla* are less numerous, elongated and terminated in a curved point at one extremity; they are very brown and nearly black."

M. Schaffner finally cites a plant in the valley of Mexico which is very poisonous, and so dangerous for cattle that they avoid the lands where it grows abundantly.

It is the *Veratrum frigidum* of Schlechtendahl (*Stenanthum frigidum* Kunth.) M. Schaffner had not seen the capsule.

I will add that, after reading this account, I have carefully examined the *sabadilla* in the collection of the School of Pharmacy, and in a quantity of about a pound have not found a single capsule of the Scrophulariaceæ, nor but a dozen brownish capsules elliptical and thin, which may possibly belong to *Veratrum sabadilla*. They were empty of seed, and I could observe no difference in the loose seeds. It appears to me certain that it is the *Asagraea officinalis* which furnishes, nearly exclusively, the *cevadilla* of commerce.

I ought to mention that M. Lucien Biart, in his letter to the Minister of Public Instruction, says that the seeds of *cevadilla* *participate but little in the energetic properties of the capsule*. This is contrary to the received view, and may have been

adopted without sufficient investigation. It will make a good subject for an inaugural essay.

#### BARBUDILLA. CONTRAYERVA.

These names are applied to very different plants; the former, named specially *barbudilla*, is the *Dorstenia Contrayerva*, L.; the other, called *julimes* by M. Schaffner, is *Asclepias Contrayerva* of the unedited Flora Mexicana. I have explained, in the "*Histoire Abrégée des drogues simples*, ii. 300," that the true *Contrayerva* of the shops is *Dorstenia braziliensis*, Lamarck, and Nees v. Essenbeck, and not the *Dorstenia Contrayerva* which grows in Mexico. What most interests me is to find through M. Merck that the root of *Asclepias Contrayerva* has been recognized as the substance always sold in Europe under the name of Mechoacan root. This resemblance also struck M. Schaffner, who writes in 1851:

"I have received, under the name *raiz de Michoacan variable*, a root which resembles in no respect that sold in Germany as white Jalap. Sometimes it seems to me that this root (of the *Asclepias*) peeled, does not differ from that formerly known under the name of *white Mechoacan root*."

M. Schaffner, writing to me in 1854, says:

"A thing which excites my curiosity is to see the root named *raiz de Michoacan*, which comes directly from the province of that name, has none of the characters attributed by you to the root which circulates in Europe under the same name. In visiting various Pharmacies in Mexico, I have found under the name of *Dorstenia of the country*, or *barbudilla*, the root of the *Asclepias Contrayerva*, very similar to that you have described under the name of *mechoacan*."

Notwithstanding the confusion which appears between *barbudilla* and *Asclepias Contrayerva*, it remains not the less true that the substance sold in Europe under the name of Mechoacan is the root of *Asclepias Contrayerva*. I will speak now of that which appears to be the true Mechoacan.

#### MECHOACHAN, MALE JALAP.

It is a long time since I have given the opinion that the Me-

choacan root of commerce was not that of a *Convolvulus*, and I thought then that it belonged to a *Tamus* of the family Dioscoreæ. I am sustained in this idea by finding subsequently in the *Histoire des drogues* of Colin, printed in 1619, that in his time they sold as Mechoacan the root of the Seal of our Lady (*Tamus communis*, L.), and I asked myself then whether the root of Mechoacan of commerce was the result of a fraudulent substitution executed in Europe, or if, being really imported from Mexico, we must be deceived in the plant producing it.

According to what has been said in the previous article, it becomes almost certain that the root sold in Europe under the name of *Méchoacan* comes from Mexico, and that it is due to *Asclepias Contrayerva*, of the Mexican flora.

As to the true Mechoacan, M. Schaffner, in 1854, had not yet seen the plant which produces it, but according to the sample which he had sent to M. Merck, this root does not differ from *fusiform* or *Male Jalap* of Ledanois, and it follows that we cannot admit that M. Ledanois has discovered a new jalap; he has only found a root which preceded jalap in its application to medicine.

M. Bourgeau some time ago sent to the School of Pharmacy a species of jalap which he said was produced by a species of *Ipomea* abundant in Pédregal, in the valley of Mexico. This root has close relations with fusiform jalap, with which it is found mixed in commerce, but it is more succulent, and more amylaceous; it is generally of a pale reddish-brown, and presents, when cut transversely, a compact structure, brown marbled with black. These differences may be due to the season of collection or the mode of drying. Besides, the root of M. Bourgeau has a musty odor, very marked.

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Besides the foregoing, M. Guibourt describes the following substances :

*Chapuy Yerba de las animas* (*Helenium autumnale*, L.)—This plant grows abundantly near Puebla; all parts of it are strongly sternutatory, but particularly the flowers and the seed.

*Chia* (*Salvia hispanica*), the seeds of which possess mucilagi-



nous properties, like quince seeds, and contain a fixed oil, sold under the name of *aceite de chia* in Mexico.

*White Copal*, *Heliocarpus copallifera* (tiliaceæ).—A resin from the hot country of the coast, which is nearly colorless, and has an aromatic but unpleasant odor. The aborigines employed it for fumigation. It is used in medicine as an application for ulcers.

*Gum of Maguey*.—The *Maguey* (*Agave americana*), noted for its saccharine juice and the liquor *pulque* it affords by fermentation, also yields, by spontaneous exudation from its leaves, a gum closely resembling gum arabic. M. Bazire says the *pulque* *Agave* is another species, the *A. americana* having a bitter juice.

M. Biart considers this gum more lauded than used. A sample sent to M. Guibourt was found to consist of conglomerated translucent tears, which possess a certain resemblance to gum arabic. Macerated in water the tears separate readily, and partially dissolve. The solution is precipitated by alcohol, and the precipitate, besides gum, contains malate of lime. The undissolved portion is chiefly bassorin.

*Mexican Gum Acacia*, or *Gum Mizquilt*.—This is the *gum Mezquite* described at vol. xxvii. p. 14, of the American Journal of Pharmacy, brought by Dr. Shumard from the region of upper Texas.

*Gomme de Nopal*.—Derived from several species of cactus by exudation, and resembles the *false tragacanth*, or *Bassora gum* of commerce.

*Gomme de Sonora* is a name given to an exudation caused by an insect,—a species of coccus,—and is analogous to shellac. The name of the plant is not given.

*Molle*, *Tree of Peru*, *False Pimenta* (*Schinus molle*, L.)—This elegant tree extends through Mexico. Its bark is an astringent, its leaves used in fomentations, and the fruit, the size of pepper, is aromatic and stimulant. By expression the berries yield an oleoresin like Canada Balsam, and the trunk yields a thick viscid juice which concretes into an insoluble kind of gum resin, having much bitterness and a disagreeable odor.

*Ule* (*Castilleja elastica*, Cerv.) belongs to the natural order *Artocarpeæ*, and yields a milky juice rich in caoutchouc.

## GLEANINGS FROM THE FRENCH JOURNALS.

*Niauli of New Caledonia.*—This is a species of myrtle of the genus *Melaleuca*, probably *viridiflora* of botanists. The tree is very common in New Caledonia, and its leaves are said to possess medicinal properties. According to the Abbé Montrouzier, Curé of Layta, in that country, the natives employ the leaves to remove the impurities of water. It is also used to improve the taste of liquors, and when the young leaves are dried they are used as a substitute for tea. An apothecary of Sidney sells a specific for rheumatism which is said to be made of this plant. If physicians find any real virtues in this plant it will be a source of advantage to the colony.—*Jour. de Pharm.*, Sept.

*Cadmiate of Potassa.*—M. Stanislaus Meunier states that he has obtained a crystallized compound of oxide of cadmium and potassa. Having ascertained that melted potassa would dissolve oxide of cadmium, a lye of potassa was thrown into the melted mixture from time to time, which caused the precipitation of a white powder which is soon redissolved. When this is continued, a period arrives when the precipitate ceases to be redissolved, when, by slow cooling, the mass is nearly entirely transformed into little crystals of hydrate of potassa. There is, nevertheless, at the bottom of the vessel a deposit of a white matter and crystals resting in an excess of alkaline lye. These are separated and dried on paper with care. The author has not thoroughly investigated this compound.—*Jour. de Pharm.*, 176, Sept., 1866.

*Cafetannic Acid.*—M. Hlasiwetz finds this acid to be a glucoside consisting of glucose and crystallizable acid,  $C_{18}H_{16}O_8$ , that the author calls *cafeic* acid. This new acid is allied to *ferulic* acid previously discovered in assafoetida.

*Carminic Acid*, according to MM. Hlasiwetz and Grabowsky, is also a glucoside, resolved by ebullition in diluted sulphuric acid into glucose and *carmine red*. Melted with hydrated potassa, carmine red forms a new crystallizable compound called by the authors *coccinin*. This is in yellow lamellated crystals, remarkable by the beautiful colorations it produces with different reagents.—*Jour. de Pharm.*, Sept.

*Physiological Effects of the Nitrate of Methyl Strychnia.* By

M. SCHROFF.—In confirming the curious fact heretofore announced by M. Stahlshmidt, (see *Jour. de Pharm.*, t. xxxvii., p. 228,) viz., the perfect innocuity of methyl strychnia when introduced into the stomach, M. Schroff has ascertained that this base, when put in contact with the blood by subcutaneous injection, is a powerful poison, because under these circumstances it recovers or resumes the poisonous properties which characterize strychnia. The author calls attention to the fact that the *curara arrow poison* may be ingested with equal freedom, and queries whether it is not of the same nature as methyl strychnia.

The experiments were made on rabbits and frogs, and the specimen employed was the nitrate prepared by M. de Vry.—*Jour. de Pharm.*, 235, Sept.

*Cholestearine in Carrots.*—MM. Frorde and Sœauer (*Arch. der Pharm.*) state that the proximate principles called *carotin* and *hydrocarotin* are simply *cholestérin* colored by a red pigment.

They possess its crystalline form, its solubility in different vehicles, its indifference to reagents, and its centesimal composition.

There appears to be no fixed relation between the proportion of these crystals and that of starch in the carrot. This is not the first time that this animal principle cholestearine has been found in vegetables, (see *Jour. de Pharm.*, xlii., p. 527). Schmidt has found 7 to 8 per cent. of cane sugar in the carrot, and the authors have recognized, in addition, asparagin and bimalate of lime.—*Jour. de Pharm.*, Sept., 1866.

*Preparation of Soluble Prussian Blue.* By M. BRUCKE.—Anatomists and physiologists have long used soluble Prussian blue for injecting their preparations. It was M. Schroeder von der Kolk who first made this application, now so much esteemed. It is very important that the Prussian blue be soluble in water. To obtain it in this form it is necessary to use a great excess of yellow prussiate in concentrated solution; the iron should be in a state of sesqui-chloride, of which one-eighth to one-tenth of the prussiate employed should be used. It should be washed on a filter with water until it commences to blue the washings, when it should be expressed and dried in the air.

On a small scale, soluble Prussian blue can be made economically in the following way :—Make on the one hand a solution of yellow prussiate containing 21·7 per cent. of that salt by weight; on the other, a solution of one part of solid sesquichloride of iron in ten of water. Take equal volumes of these solutions, and add to *each* twice its volume of a cold concentrated solution of sulphate of soda; then pour the sesquichloride into the prussiate, stirring constantly; throw the whole on a filter, and when it has drained, wash with cold water until it begins to color the water. The product when dry is perfectly soluble in water, and makes beautiful injections.—*Jour. de Pharm.*, Sept., 1866.

*Strychnia in Strychnos Tieuté.*—M. Bernelot-Moens (*Zeitschr. fur Chem.*, 1866,) says *Strychnos tieute* grows spontaneously in Java, and that its seeds are richer in strychnia than *nux vomica*. When dry, they contain 1·469 per cent. of this alkaloid, with but traces of brucia.

*Aspartic Acid in Beet Root Molasses.* M. SCHREIBLER, (*Zeitsch. fur Chem.*, 1866).—Asparagin has been discovered in beet juice by M. Dubrunfont, whilst others have failed in finding it. The author attributes this failure to the fact that when the juice is defecated with lime, the asparagin is converted into aspartic acid and ammonia, and is thus lost; and he attributes to this cause the evolution of ammonia always observed in beet sugar-making when lime is used. He obtains it thus:—The molasses, diluted conveniently, is precipitated first with basic acetate of lead in slight excess, filtered, and a solution of nitrate of protoxide of mercury added, which throws down the acid as aspartate of mercury, which is washed and decomposed with sulphuretted hydrogen, filtered and evaporated to a syrupy consistence, which, on standing, deposits prismatic crystals of the acid. These are washed with cold and hot alcohol, and afterwards recrystallized from water. The author has also found an alkaloid which is very soluble in water and alcohol, and possesses a strong odor of musk. It is deliquescent, and by heat gives off ammonia, accompanied by an odor of prussic acid and caramel. M. Nickles says that this is probably triethylammin.—*Jour. de Pharm.*, Sept., 1866.

*Oleic Acid*.—MM. Bolley and Borgmann have examined the question whether oleic acid is susceptible of distillation without decomposition, and they establish that this acid is volatilized unaltered at the temperature of 482° F., in a current of superheated steam. But they have also determined that at a more elevated temperature decomposition sets in, and the product becomes contaminated with derivative products, acid and neutral, among which are capric and caprilic acids, and some hydrocarbons.

This state of things explains therefore the preference that soapmakers accord to oleic acid from lime soap, to the detriment of oleic acid by the action of sulphuric acid and subsequent distillation. The former saponifies best and more completely than acid distilled at an irregular temperature, because it is exempt from neutre fats, which embarrass the soapmaker.—*Repert. de Pharm.*, Mai, 1866.

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#### BEET-SUGAR—PROGRESS OF ITS MANUFACTURE IN FRANCE AND GERMANY.

We copy the following interesting remarks upon the production of beet-sugar in Europe, from the *Monthly Report of the Department of Agriculture* for April. They occur as an introduction to a communication upon the same subject addressed by our Consul at Berlin to the State Department. The communication itself is statistical and contains little in addition to the information contained in the communication of our intelligent correspondent, Mr. Hirsh, which appeared in a recent number of the *Journal*, and we therefore omit it:

Although the manufacture of beet-sugar was first established in France, yet the fact that the beet yielded sugar was first ascertained by Margraff, a Prussian, in 1747. But no practical good was accomplished by him. Twenty-five years afterward, another chemist of Berlin, Archard, renewed the investigation of the subject, under the encouragement of Frederick the Great, but it was not until 1795 that he published anything in reference to it. In theory he maintained the utility of the manufacture, not only for the sugar that the beet would yield, but because of the profitable use that might be made of the leaves and pulp

after the pressure from it of the juice, and the manufacture into alcohol or vinegar of the residues left of the sugar manufacture.

In 1799 he made the first sugar from a farm of sixty acres in beet cultivation. A commission reported favorably, and in the same year the subject was first investigated in France, and the society of agriculture of the Seine awarded a gold medal to Archard. The wars of the first Napoleon leading to a blockade of the ports of the continent, sugar, in France, rose to \$1.20 per pound. This forced Napoleon to a consideration of the best ways of obtaining a home-made supply, and he appointed a commission to examine and report on the matter. In 1810 they made their report in favor of beet-sugar. In 1812, Benjamin Delessert succeeded in producing refined crystallized white beet-sugar, for which the Emperor conferred upon him the Cross. Soon afterward  $1\frac{1}{2}$  per cent. of sugar on the weight of the beet worked was obtained, at a cost of  $30\frac{1}{2}$  cents per pound. In 1813, 3,500 tons of 2,240 pounds were made by 334 manufacturers.

The peace of 1814 raised the blockade from the ports, and the price of sugar from \$1.20 per pound fell to 14 cents, causing the stoppage of all the manufactories that had been erected for the production of beet-sugar.

France at that time had, as cane-producing colonies, Martinique, Guadaloupe, Guyana and Boulon, and in 1814, Louis XVIII., King of France, laid a duty of \$80 per ton on French colonial sugar, and \$200 per ton on all foreign sugar. In 1825 the manufacture of the beet-sugar began to revive, and in 1828 there were 58 manufactories, yielding 2,685 tons of sugar.

At that time, in order to encourage the refining of sugar in France, foreign and colonial cane-sugar was admitted in its brown state only, and a premium upon exportation of the refined sugar was allowed the refiners. These opposed the manufacture of refined sugar from the beet, and combining with the shipping interest in the foreign and colonial sugar trade, demanded an internal tax upon beet-sugar. This demand was defeated, especially through the political events of 1830, and the production of beet-sugar increased. In 1834 it was 20,000 tons; in 1836, 40,000 tons, made in 436 manufactories. But the opponents to this domestic production continued the conflict, and at last suc-

ceeded in having an excise tax laid upon it of \$32.88 per ton in 1838. The unfavorable influence of this tax caused a decrease of production, so that in 1840 but 22,000 tons were made, 166 factories were closed, and the manufacture of sugar ceased in 17 departments. In 1840 further legislation was had, resulting in fixing a duty on colonial cane-sugar of \$90 per ton, and an excise tax on beet-sugar of \$50 per ton; a discrimination of \$40 per ton in favor of the latter. In 1842 the quantity of beet-sugar rose to 33,000 tons, but the colonial opposition was renewed, and the government proposed to the Chambers the entire suppression of the beet-sugar trade. It rejected this extraordinary proposition, and the controversy was settled in 1843 by an equal duty and tax of \$90 per ton on colonial and beet-sugar.

In that year the manufacture of beet-sugar was 28,000 tons; the import of colonial sugar 83,000 tons. In 1847 the first advanced to 50,000 tons, the latter to 88,000. In 1850, the beet-sugar production reached 62,000 tons, and the colonial cane-sugar had decreased to 51,000 tons. In 1852 another change unfavorable to beet-sugar was made by the tariff regulations, and this was followed by two seasons unfavorable for growing the beet; but in 1853 a disease of the vine greatly lessened grape alcohol, which doubled in price, when the manufacturers of beet-sugar turned their attention to the production of alcohol from the beet. The production of beet-spirit in 1852 was 352,000 gallons; in 1857 it was 9,240,000 gallons, and that from the vine showed almost an equal increase. But in this last year the vine recovered from the disease, when the manufacture of beet-sugar was resumed to its full extent. In 1858 its manufacture was 124,000 tons, and the importation of colonial cane-sugar was 116,000 tons.

In 1860 the internal tax was again changed to \$60 per ton on beet-sugar; a duty of \$52.88 was laid on colonial sugar, and of \$66.12 on foreign sugar.

The per cent. of sugar now obtained by improved processes, is from 5 to 6; the Germans get from 7 to 8. But in Prussia greater care is observed in the selection of the beets used. The crop is successively immersed in three different tanks of salt water of the densities of 4, 5 and 6 degrees Baumé; the roots

floating in the first tank are rejected; those which float in the second tank form the third quality of beet; those which float in the third tank constitute the second quality of beet, and those which sink in it make the first class of beet. The cost of the production of beet-sugar has been reduced to about four cents per pound; the tax is about three cents, other charges about  $1\frac{1}{2}$  cent, making the selling price from 9 to 11 cents per pound.—*Druggists' Circular*, Sept., 1866, from *Sorgho Journal*.

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### ON THE ABSORPTION AND DIALYTIC SEPARATION OF GASES BY COLLOID SEPTA.

BY THOMAS GRAHAM, F.R.S.

It appears that a thin film of caoutchouc, such as is furnished by varnished silk or the transparent little balloons of india-rubber, has no porosity, and is really impervious to air as gas. But the same film is capable of liquefying the individual gases of which air is composed, while oxygen and nitrogen in the liquid form are capable of penetrating the substance of the membrane (as ether or naphtha does), and may again evaporate into a vacuum and appear as gases. This penetrating power of air becomes more interesting from the fact that the gases are unequally absorbed and condensed by rubber, oxygen  $2\frac{1}{2}$  times more abundantly than nitrogen, and that they penetrate the rubber in the same proportion. Hence the rubber film may be used as a dialytic sieve for atmospheric air, and allows very constantly 41.6 per cent. of oxygen to pass through, instead of the 21 per cent. usually present in air. The septum keeps back, in fact, one-half of the nitrogen, and allows the other half to pass through with all the oxygen. This dialysed air rekindles wood burning without flame, and is, in fact, exactly intermediate between air and pure oxygen gas in relation to combustion.

One side of the rubber film must be freely exposed to the atmosphere, and the other side be under the influence of a vacuum at the same time. The vacuum may be established within a bag of varnished silk or in a little balloon, the sides being prevented from collapsing by interposing a thickness of felted carpeting between the sides of the varnished cloth, and by filling the



balloon with sifted sawdust. For commanding a vacuum in such experiments, the air exhauster of Dr. Hermann Sprengle\* is admirably adapted. It possesses the advantage that the gas drawn from the vacuum can also be delivered by the instrument into a glass receiver placed over water or mercury. The "fall tube" has merely to be bent at the lower end.

The surprising penetration of platinum and iron tubes by hydrogen gas, discovered by MM. H. Sainte-Claire Deville and Troost, appears to be connected with a power resident in the same and certain other metals to liquefy and absorb hydrogen, possibly in its character as a metallic vapor. Platinum in the form of wire or plate at a low red heat may take up and hold 3.8 volumes of hydrogen, measured cold; but it is by palladium that the property in question appears to be possessed in the highest degree. Palladium foil from the hammered metal, condensed so much as 643 times its volume of hydrogen, at a temperature under 100° C. The same metal had not the slightest absorbent power for either oxygen or nitrogen. The capacity of fused palladium (as also of fused platinum) is considerably reduced; but foil of fused palladium, for which I am indebted to Mr. G. Matthey, still absorbed 68 volumes of gas. A certain degree of porosity may be admitted to exist in these metals, and to the greatest extent in their hammered condition. It is believed that such metallic pores, and indeed all fine pores, are more accessible to liquids than to gases, and in particular to liquid hydrogen. Hence a peculiar dialytic action may reside in certain metallic septa, like a plate of platinum, enabling them to separate hydrogen from other gases.

In the form of sponge, platinum absorbed 1.48 times its volume of hydrogen, and palladium 90 volumes. The former of these metals, in the peculiar condition of platinum black, is already known to take up several hundred volumes of the same gas. The assumed liquefaction of hydrogen in such circumstances appears to be the primary condition of its oxidation at a low temperature. A repellant property possessed by gaseous molecules appears to resist chemical combination as well as to estab-

\* Chemical Society's Journal, ser. 2, vol. iii. p. 9 (1865.)

lish a limit to their power to enter the minuter pores of solid bodies.

Carbonic oxide is taken up more largely than hydrogen by soft iron. Such an occlusion of carbonic oxide by iron at a low red heat appears to be the first and a necessary step in the process of acieration. The gas appears to abandon half its carbon to the iron, when the temperature is afterwards raised to a considerably higher degree.

Silver has a similar relation to oxygen, of which metal the sponge, fritted but not fused, was found to hold in one case so much as 7.49 volumes of oxygen. A plate or wire of the fused metal retains the same property, but much reduced in intensity, as with plates of fused platinum and palladium in their relation to hydrogen.—*Chem. News*, Aug. 24, 1866, from *Proc. Royal Society*.

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#### ON THE ESTIMATION OF MORPHIA IN OPIUM: IMPROVEMENTS ON M. GUILLERMOND'S PROCESS.

By M. ROUSSILLE.

M. Guillermond's process, which consists in macerating the opium in cold alcohol of 72 per cent., is very accurate, but it possesses the inconvenience of being long. I propose to introduce some modifications. 15 grammes of opium are treated with 25 grammes of boiling water till complete disaggregation; then add 60 grammes of boiling alcohol at 40°; digest for an hour, and filter through linen; then treat the residue again with 10 grammes of water and 60 grammes of alcohol as before. Now extract the residue with 50 grammes of boiling absolute alcohol. All the liquids collected together and cooled are to be carefully filtered, evaporated to one-third, and filtered again after cooling. Then precipitate the morphia with 10 grammes of ammonia, and evaporate over sulphuric acid. At the end of three days collect the deposited crystals, and wash them with ether and with water.

Six successive trials have given the same results as by Guillermond's process, which takes more than five days, whilst this only requires three.—*Chem. News*, Oct. 5, 1866.

## ON ACONITE.

BY THOS. B. GROVES, F.C.S.

Of the two questions relating to aconite, on which I have undertaken to report, the first is, "Does Aconite owe any of its activity to the volatile acrid body said to exist in it?" I cannot find that this acrid body *said* to exist in aconite has yet been isolated. Its existence has simply been *inferred* from certain circumstances observed in the pharmaceutical treatment of the plant, and from analogy.

M. Geiger was the first to start the theory that aconite owed its acidity to one body, its narcotic property to another; and affirmed that the former was easily destroyed, the latter not so easily. This ready destructibility is supposed by M. Geiger to be a sufficient reason for its non-production; but Mr. Wesse states that ordinary aconite, containing, as he also asserts, the two principles intimately combined, can be purified from the acrid principle by several solutions in acid and precipitations by alkali. He did not, however, succeed in isolating it. Query, whether he did not really, by this mode of procedure, simply lose the greater portion of the aconitine (which is well known to be soluble in 150 parts of cold water), leaving only the inert matter with which the commercial article is so largely contaminated.

Volatility has been accorded to this supposed acrid body, in consequence of the ready dissipation, as some have affirmed, of the activity of aconite by simple drying or by boiling in water. But Christison denies the former statement as regards *Aconitum Napellus*, asserting, on the contrary, that when carefully dried, either by water-bath or spontaneously, its activity is not much impaired; on the other hand, travellers report that the Swedes eat as a pot-herb one species of aconite when boiled. It seems to me that these views may have their origin solely in the ready destructibility of aconitine (a fact no one will gainsay who has occupied himself in its preparation), aided by the argument from analogy of some of the other *Ranunculaceæ*. The genera *Clematis*, *Anemone*, *Ranunculus*, furnish volatile, acrid, oily, or concrete bodies, which fairly represent the powers of the plants whence they are derived. Of these the *Anemonine* has been fully

described, and its composition and reactions tolerably well ascertained; of the others little is known. None appear to be alkaline, but if otherwise than neutral, inclined to acidity. They do not contain sulphur, and are comparable with the acrid principle of the *Arum* rather than that of the *Cruciferae*.

My experiments on the question have been limited to distilling one batch of the plant and one of the fresh roots, my crops of aconite having been comparative failures. The simple distillation of the green plant with water having already been tried without result, I distilled mine with the addition of lime, for the purpose of isolating any basic body of a volatile nature, but held down by acid. The distillate I obtained was from the first distinctly alkaline, had an herbaceous flavor, but was quite limpid. The alkalinity continued during the whole course of the operation, which suggested to me a gradual decomposition rather than a simple elimination. The distillate neutralized with oxalic acid was carefully evaporated at a low temperature to a few ounces. It was then turbid and slightly colored. It gave no indications of the presence of an alkaloid when tested by the usual reagents; and when redistilled with an excess of lime, in order to remove the little organic matter that had come over with the first distillate, it presented the characters of liquid ammonia pure and simple.

The distillation of the bruised roots was conducted in the usual way, water only being added. The distillate was neutral to test-paper, slightly opalescent, but entirely devoid of acidity. It of course smelt and tasted strongly of the plant. The liquid contained no alkaloid, but on applying the usual reagents it clearly manifested the presence of ammonia in minute quantity. It was therefore treated with an excess of pure carbonate of potash, and evaporated with the view of ascertaining the nature of the acid with which the ammonia was combined. When brought to a small bulk the carbonate was neutralized with sulphuric acid and rectified spirit added. The filtrate and precipitate, on examination, showed conclusively that no organic acid was present, but that the salt of ammonia was no other than the hydrochlorate in very minute quantity.

After drawing over sufficient distillate for the above purpose,

milk of lime was added to the contents of the still. The distillate then assumed a different character, being decidedly alkaline, as in the case of the green parts of the plant, but the yield of ammonia was much greater.

Some experiments were made with the view of ascertaining if the ammonia could possibly have been derived from the decomposition of aconitine by lime. I found, however, that lime-water gave a distillate decidedly alkaline to test-paper, and that the introduction into the retort of a little aconitine made no appreciable difference. It is, moreover, to be remembered that the roots distilled without lime gave an ammoniacal, though neutral, distillate, and that the quantity of ammonia obtainable by the use of lime, though small, is far greater than could possibly be accounted for on the above supposition. The only principle other than aconitine that I am able to suggest as capable of accounting for the difference observed between the physiological action of aconitine and that of the dried root, is the acrid resin with which the roots may be said to abound. I have no doubt that body does exert an important action when applied topically. The loss of strength observed in drying aconite plants is doubtless due (as I have before said) to the very ready destructibility of the alkaloid aconitine.

My conclusion, "that *Aconitum Napellus* does not contain a volatile acrid body to which may be attributed a part of the poisonous effects of the plant," is one that I had anticipated, for the analogy of the other *Ranunculaceæ* seemed, in my opinion, to point that way. It is true, as some writers have insisted, that *Anemone* and *Ranunculus* furnish acrid volatile principles; it is no less true that they furnish nothing else of much activity. Aconite, on the other hand, has been long known to furnish the alkaloid aconitine—a body sufficiently acrid and energetic to account for the poisonous character of the plant; and it seems to me but probable that in Aconite it occupies the place which in *Ranunculus* and *Anemone* is filled by the volatile acrid bodies to which I have referred.

#### *Aconitine.*

Since the discovery of this alkaloid by Geiger and Wesse, in 1833, it has, from its extreme activity as a poison, and the great

difficulty of obtaining it pure, much attracted the attention of pharmacutists. As a *tour de force*, its preparation possessed a charm for me, so that during the last ten years or so I have made several attempts to obtain it.

Dr. Turnbull was one of the first to introduce it into the medical practice of this country, and himself published several processes for preparing it. The following is his first method,—expressly designed, one would imagine, for showing “how not to do it:”—

“Procure fresh roots of Aconite, dry, and powder; mix one part of root with two parts of spirit, and digest for seven days. The warm tincture filtered, carefully reduce it to a fluid extract. To it add Liquid Ammonia, but not too much, ‘as in some instances the product appears to have been decomposed by inattention to this circumstance.’ The precipitated mass is now boiled with Alcohol or Sulphuric Ether to remove the alkaloid, or treated with cold water to remove the extractive, etc., which last method the doctor prefers, in which case the residue is purified by solution in Alcohol. The light brown or gray powder thus obtained is extremely poisonous; one-third of a grain caused the death of a guinea-pig in a few minutes.”

This process was afterwards somewhat improved by adding cold water to the spiritous extract, filtering off the precipitated resin, and precipitating from the filtrate the alkaloid of ammonia. The purification is effected by washing repeatedly with cold water. The product is said to be white.

This modified form is very nearly that prescribed in P. L. 1826. The P. L. of 1851 entirely omitted both its description and preparation. It is not surprising to find that by following these methods the products of different laboratories were by no means alike, either in activity or chemical characteristics, whilst more frequently the alkaloid was altogether missed. Thence its preposterous price (3s. 6d. a grain), and the discredit, so uncertain yet at times so frightfully active an agent began to find attached to it. Thence, also, the contradictory accounts of writers on the subject, some affirming it to be crystallizable, others not so. Similar differences as to its effect on the pupil are yet not settled. The preparation of Mr. Morson is stated to be the only one to

be relied upon for purity, but possibly this is not so true now as it was twenty years ago, when Dr. Pereira swallowed a full grain of a French so-called aconitine, without experiencing from it any effect whatever, whereas Mr. Morson's preparation had caused danger to a patient taking  $\frac{1}{50}$ th of a grain only. Dr. Von Planta, writing in 1850 of Merk's aconitine, found it contained both resinous and earthy matters.

A good deal has lately been written about the chemistry of aconite,—more, in fact, than I care to transcribe. I will, however, point out a very good process for preparing aconitine, devised by MM. Liégois and Wattot. It may be found at length in the forty-fourth volume of the '*Journal de Pharmacie et de Chimie.*' It may be described shortly thus:—

"Macerate for eight days the coarsely-powdered root in sufficient rectified spirit, acidulated slightly with sulphuric acid; express, distil off the greater part of the spirit, and allow the liquid to cool; remove from its surface the floating oil and resin, continue the evaporation to a syrupy consistence, wash lightly with sulphuric ether to remove all traces of resin; add magnesia, agitate several times with sulphuric ether, to remove the alkalioid; evaporate the sulphuric ether, dissolve the residue in a slight excess of sulphuric acid, precipitate gradually by dilute ammonia, rejecting the first portions which are colored. The latter portions are perfectly white, and, in the opinion of the inventors, respond to all the requirements of pure aconitine." This preparation, nevertheless, shows no tendency to crystallize, and hence differs from most of the aconitines of commerce, which more frequently than not are partly crystalline. It is said, also, to differ from them in possessing much greater activity. The medicinal dose has been fixed at half a milligramme = seventy-seven ten-thousandths of a grain.

The process for aconitine contained in the British Pharmacopœia is a great improvement on its predecessor, and with slight modifications would give fair results.

At the Exhibition of 1862 every pharmacist must have noticed with surprise and pleasure the magnificent specimen of aconitine in perfectly defined large crystals contributed by Mr. Morson. That fact must be admitted to have settled the question

of crystallizability. Moreover, at the same Exhibition I showed small specimens of the same alkaloid crystallized in its free state, as hydrochlorate, hydriodate, and nitrate, which some two years before I had prepared by a process which I will proceed to explain, first observing that it is one of general application.

I prepare a strong tincture of aconite, by macerating for about a week 5 lb. of coarsely-powdered aconite root in 1 lb. of methylated spirit, acidulated with  $2\frac{1}{2}$  oz. of strong hydrochloric acid. The materials being of less value than my time, I simply express the fluid (leaving about one-sixth in the marc unrecovered) add to it half a pint of water, and distil off the spirit. During the distillation the resin and oil gradually separate, leaving the basic matters in possession of the acid watery fluid left in the retort. It is poured from thence to an open basin, and the last traces of spirit chased off. When cool, the clear liquid is separated by pipette and filter from the thick oily mass floating on it. This operation requires both time and patience, but it is advisable to do it well, and completely purge the liquid of matters insoluble in acidulated water. To the clear liquid add a slight excess of a strong solution of iodohydrargyrate of potash; heat gradually the resulting thick creamy fluid to about  $100^{\circ}$ , stirring the while, and separate the concrete resinous mass that results. In this way I have got on the average an ounce of crude iodohydrargyrate, to decompose which is the next business. The best way to do this is to dissolve it in hot methylated spirit, and add a slight excess of nitrate of silver in hot watery solution. By this means the whole of the iodine is removed in the simplest way, but, it may be objected, not in the most economical, as a slight loss may be expected when the iodide transferred to the silver bottle arrives at its appointed time for reduction. The loss, however, is so small as not to be worth consideration when the process is followed on an experimental scale only. In the large way I should treat it first with sulphide of ammonium, then with acetate of lead. It is necessary to use both, as I find the lead alone removes only half the iodine, the remaining half interfering greatly with the subsequent operations. But by first removing the mercury as sulphide, and then using the lead, the liquid is completely cleared of that troublesome element. I could not at first under-



stand the product I obtained by adding ammonia to the liquid containing the aconitine in the presence of iodine, and washing with sulphuric ether, nor at all comprehend why an alkali of some sort did not precipitate the alkaloid from such a solution. It appeared, however, that the hydriodate of aconitine is not decomposable by alkalies, and that when such a mixture is shaken with abundance of sulphuric ether the hydriodate in a pure state is the only thing taken up. An additional embarrassment is felt by the inutility of shaking the sulphuric ether holding the hydriodate in solution with acidulated water with the view of recovering the alkaloid as a muriate or nitrate.

To return from my digression. The liquid filtered from the iodide of silver contains now nitrates of mercury, of silver (in minute quantity), and of the alkaloid, and the latter may at once be obtained in a pure state by adding an excess of carbonate of potash, and washing two or three times with ether. But I prefer first removing the mercury by sulphuretted hydrogen, as it renders the washing with ether so much easier and neater. The ether evaporated or recovered by distillation leaves a residue of a pale brown color, which is partly crystalline, partly translucent like a fused resin, and exhibits a strongly alkaline reaction. On the average I obtained of this rather more than ten grains per pound of root, or, making allowance for that remaining in the marc, twelve grains per pound.

The aconitine is then dissolved in water with a very slight excess of nitric acid, filtered, and set aside to crystallize. This it commences to do at once, one-half or thereabout of the aconitine being so obtainable. I find it crystallizes much more easily as nitrate than as sulphate or hydrochlorate. The crystalline form of the nitrate appears to be the rhombic prism, commonly with dihedral summits. They readily effloresce when heated, losing their transparency, as is the case with the specimen exhibited, which was accidentally exposed to the direct rays of the sun. The nitrate does not dissolve readily in cold water; from its solution in hot water it crystallizes with unusual facility.

Tried on the eye of a cat, it produced during the first half-hour no effect beyond irritation of the neighboring membranes; after an hour it caused permanent dilatation of the pupil. Its color-

test reactions are neutral, nothing marked about them. It is precipitated by bichloride of platinum. From this nitrate the pure crystalline alkaloid is obtainable by the ordinary method—precipitation by ammonia and solution in spirit. It may be objected that this crystalline body is not aconitine. I can only say that it possesses in a high degree the poisonous properties of the root; for some years ago, not being in a position to repeat the experiment quoted by Orfila from Matthioli, viz., the administration of Aconite to *four* highwaymen,—the mediæval response to the proverb “Fiat experimentum in corpore vili,”—I took a dog of medium size, and gave him  $\frac{1}{40}$ th of a grain of these crystals. He vomited within an hour after, foamed at the mouth, was purged, with great apparent irritation of the anus, but recovered sufficiently to have a second dose of  $\frac{1}{20}$  grain a few days after, or the next day, I forget which. This, notwithstanding his great efforts to remove the poison from his stomach by vomiting, would certainly have killed him had I not interposed with emollient drinks and careful nursing. The crystalline variety of aconitine ought, I think, to be solely used for the internal administration of Aconite, superseding the present dangerous preparations of root and leaf which now are used so rarely because so unreliable. I would suggest for this purpose a powder of aconitine reduced with sugar of milk to a convenient degree, and also a watery solution with sufficient spirit to keep it from moulding. Half a grain to the ounce—about a thousandth part—would perhaps be a convenient proportion for each.

I ought not perhaps to omit to mention the discovery of Nappellin, announced many years ago in the ‘Écho Médicale de la Suisse.’ It is described as differing from aconitine in being very sparingly soluble in ether, and not precipitable from acid solution by ammonia. I can only say I have never met with it.

I must say the same of Messrs. Smith’s discovery of Narcotin in Aconite Root. I have not heard the discovery affirmed; and as nearly all the processes of late years adopted for the preparation of aconitine would serve equally well for the search for narcotin, as the latter body is also so readily distinguishable from the former by its splendid reaction with nitro-sulphuric acid, contrasting with the negative result, I cannot but think the case

in which it is said to have occurred perfectly exceptional; in fact, were it announced from any other laboratory than that of Messrs. Smith, one would be tempted to ask whether or no, by accident or mischievous design, some narcotin had not been introduced into the aconitine preparation.

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The PRESIDENT remarked upon the highly interesting nature of the inquiry as to the existence of a volatile acrid principle in aconite, as had been so confidently asserted in some quarters. Mr. Grove's results appeared to set this matter at rest.

Mr. GILES thought that in speaking of the doses of the more potent alkaloids and other active principles, we should recognize how different were their actions upon different individuals. He had known half a grain of extract of belladonna produce all the symptoms of poisoning. The results of such idiosyncrasies should be borne in mind, and impressed upon physicians who prescribed the more active remedies.

Mr. GROVES could not but reiterate the objections that he had already expressed to the use of galenical preparations of indefinite strength, consequent upon variations in the plants used.—*Proc. Brit. Pharm. Conf. in London Pharm. Jour., Sept., 1866.*

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# ON THE MUTUAL ACTION OF THE ELEMENTS OF SOLUBLE SALTS WITHOUT AND WITHIN THE ANIMAL ECONOMY.

By M. MELSENS.

The experiments already made by the author, he considers, justify him in formulating the following proposition:—

*Two soluble salts which are without apparent mutual action, and which may be given separately to animals without producing any disturbance in the body, may, when administered together, act as a poison:—*

Facts of this kind, proved by experiment, have a great importance, both from physiological and therapeutical points of view.

The two salts more especially experimented with by the author are chlorate of potash and iodide of potassium. These two

salts in solution together crystallize separately under whatever conditions they may be placed. Their mixture in solution in equivalent proportions undergoes no mutual decomposition either at the ordinary temperature, on boiling, or under the pressure of 10 atmospheres at 185° C. It can be proved by means of sulphydric acid that no iodate of potash is formed.

But when the two salts are heated together in the dry state, decomposition takes place at the point of fusion, and iodate of potash is formed.

When a certain quantity of mineral acid is added to a mixed solution of the two salts, iodine is set at liberty, and the solution behaves towards sulphydric acid as though iodic acid had been produced.

When the mixed solutions are submitted to electrolysis, hydrogen is disengaged at the positive pole, and the liquor appears to contain both iodide and iodate.\*

We come next to the effects of the before-mentioned salts on animals. Seven grains of chlorate of potash were given to a bitch weighing eleven kilos. every day for a month; the animal did not at all suffer. Afterwards five grammes of iodide of potassium were given daily for the same period. The animal suffered a little during the first days, but at the end of the month was perfectly well.

If, on the contrary, we administer to a dog daily seven grammes of a mixture of iodide of potassium and chlorate of potash in equivalent proportions, the animal languishes and dies about the twenty-fifth or twenty-eighth day. On commencing the experiment one dog weighed 16·5 kilos.; at the moment of its death it weighed only 11·5 kilos. The experiment repeated on several dogs gave similar results. Death often supervened about the fifth day.

\* To avoid the action of chlorine, iodine, and oxygen, the author employed retort coke as the positive electrode. The carbon was previously treated with aqua regia, and then ignited in a current of chlorine. The carbon employed in the above experiment was disaggregated, and in part burnt to carbonic oxide and acid, and at the same time a soluble black carbonaceous matter was obtained, similar to the ulmic product which the author obtained by the action of chlorine on the carbon contained in the lungs in *melanosis*.

Post-mortem examinations revealed changes similar to those observed by the author when iodate of potash was administered, especially in the liver and intestines, but it is necessary to make a series of comparative experiments with the iodate, free iodine, and mixtures of the two salts.

The author has shown in previous memoirs that the iodate of potash acts as a poison. This salt, given in doses of one or two grammes daily, will kill a small dog in a few days. A mixture of the two salts cannot be so active as the iodate, since both unchanged iodide and chlorate may be found in the urine. The author is therefore brought to the conclusion that the mutual action of the two salts in the economy takes place with the greatest facility. It may be supposed that the acids of the stomach and the electrolytic actions which take place in the organism play an important part in bringing about this decomposition. But beyond all hypothesis it is necessary to admit that changes take place in the animal system which cannot be realized in the laboratory under ordinary conditions, or with the assistance of a high temperature, strong acids, or even the electric current.—*Lond. Chem. News*, August 17, 1866, from *Bulletin de la Soc. Chim. de Paris*, July, 1866. Abstract from the *Bull. de l'Acad. Royale de Belgique*, 1866.

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#### ON THE EMPLOYMENT OF NITROGLYCERINE IN QUARRIES.

By M. E. Kopp.

The explosive properties of nitroglycerine  $C_6H_5(NO_4)_3O_6$ , and the accounts of experiments made with it in different parts of Sweden, Germany, and Switzerland, determined MM. Schmitt and Dietsch, the proprietors of the great quarries of sandstone in the valley of Zorn, Lower Rhine, to try to use it in their works.

The trial proved so successful, both as regards economy and the ease and rapidity with which the work was performed, that, for the time at least, they have abandoned the use of powder, and the quarries have been entirely worked by nitroglycerine for six weeks.

From the first we have considered that the nitroglycerine should be prepared on the spot; it always seemed to us the transport of an explosive compound of such frightful power ought not to be allowed either by land or water. The terrible accidents which have happened at Aspinwall and at San Francisco, justify these fears, and the transport of nitroglycerine should be positively forbidden.

After having, with M. Keller's assistance, studied in my laboratory the different processes of the preparation of nitroglycerine (mixtures of glycerine with concentrated sulphuric acid and nitrates of potash and soda or with nitric acids of different concentrations), we have determined on the following method of manufacture, which is performed in a wood cabin, constructed in one of the quarries.

1. *Preparation of Nitroglycerine.*—We begin by mixing in an earthenware vessel placed in cold water some fuming nitric acid at 49° or 50° Baumé (1.51—1.53) with twice its weight of the strongest sulphuric acid. These acids are purposely prepared at Dieuze, and sent on to Saverne. At the same time we evaporate in a pot some commercial glycerine free from both lime and lead, until it makes 30° or 31° Baumé (1.26—1.27). This concentrated glycerine should, after cooling, have a syrupy consistence.

The workman then throws 3300 grammes of a mixture of sulphuric and nitric acids well cooled into a glass flask (a pot of earthenware or a capsule of porcelain might equally be employed) placed in a trough of cold water, and then he slowly pours into it, stirring it continually, 500 grammes of glycerine. The thing to be observed is the avoidance of any sensible heating of the mixture, which would determine a tumultuous oxidization of the glycerine and the production of oxalic acid. For this reason it is that the vessel in which the transformation of the glycerine into nitroglycerine takes place, should be constantly cooled externally by cold water.

When the materials are thoroughly mixed, the whole must be left for five or ten minutes; then pour the mixture into five or six times its volume of cold water, to which a rotatory movement must first be imparted. The nitroglycerine precipitates very

rapidly under the form of a heavy oil, which is collected by decantation into a vessel; then wash it with a little water which is in its turn decanted, pour the nitroglycerine into bottles, and it is ready for use.

In this state, the nitroglycerine is still slightly acid and watery; but this is of no importance, since, as it is employed soon after its preparation, these impurities in no degree prevent detonation.

II. *Properties of Nitroglycerine.*—Nitroglycerine is a yellow or brownish oil, heavier than water and insoluble in it, but soluble in ether, alcohol, &c.

Exposed to a prolonged but not intense amount of coldness, it crystallizes in long needles. A violent shock best causes it to detonate. The handling of it is now easy and only slightly dangerous. Spread upon the ground it is only with difficulty fired by a body in combustion, and then only burns partially; a flask containing nitroglycerine may be broken upon stones without its detonating; it may be volatilized without decomposition by a regulated heat; but if it boils, detonation becomes imminent.

A drop of nitroglycerine falling on a metal plate moderately heated volatilizes quietly. If the plate be red-hot, the drop is immediately fired and burns like a grain of powder, only noiselessly; but if the plate, without being red-hot, is hot enough to make the drop boil immediately, it decomposes suddenly with a violent detonation.

Nitroglycerine, especially when impure and acid, decomposes spontaneously after a certain time, with an escape of gas and the production of oxalic and glyceric acid.

Probably the spontaneous explosions of nitroglycerine, with whose disastrous effects the papers have acquainted us, are owing to the same cause. The nitroglycerine being enclosed in well-corked bottles, the gases produced by its spontaneous combustion cannot escape; they then exercise an immense pressure on the nitroglycerine, and in this state the least shock and the slightest movement will cause an explosion.

The flavor of nitroglycerine is at once sweet, piquant, and aromatic; it is poisonous, and taken in small doses it produces

bad headaches. Its vapor produces similar effects, and this reason might well prove an objection to its use in the subterranean galleries of mines, where its vapors cannot disperse as they do in open-air quarries.

Nitroglycerine is not, properly speaking, a nitrated body, such as nitro- or binitro-benzol, or mono- bi- and trinitro-phenisic acids. Indeed, under the influence of reducing bodies, such as nascent hydrogen, sulphuretted hydrogen, &c., the glycerine is set at liberty, and the caustic alkalies decompose the nitroglycerine into nitrates and glycerine.

III. *Modes of employing Nitroglycerine.*—Suppose the object is to detach a stratum of rocks. At 2·50 to 3 metres distance from the exterior border sink a mining hole about 5 or 6 centimetres in diameter and 2 or 3 metres in depth.

After having thoroughly cleared all mud, water and sand out of the hole, pour into it, through a funnel, from 1500 to 2000 grammes of nitroglycerine. Then immerse in it a little cylinder of wood, pasteboard, or tin, about four centimetres in diameter, and from five to six centimetres in height, and filled with ordinary powder. This cylinder is fixed to an ordinary mining fuse, which goes down a certain depth to insure the combustion of the powder. The cylinder is lowered by means of the wick or fuse; the moment the cylinder reaches the surface of the nitroglycerine may easily be known by the touch. When it touches the surface, hold it perfectly still, and pour sand into the hole until it is quite full; there is no need to compress or plug the sand. Cut the wick some centimetres from the orifice of the hole, and then set fire to it. In about eight or ten minutes the match burns down to the powder and fires it. Then ensues a violent shock, which immediately causes the detonation of the nitroglycerine. The explosion is so sudden that the sand is not even projected.

The whole mass of the rock rises, is displaced, then resettles without any projection; only a dull detonation is heard.

Only on examining the spot can an idea be formed of the power of the force developed by the explosion. Formidable masses of rock are slightly displaced and rent in every direction, and ready to be removed mechanically.



The chief advantage is that the stone is only slightly crushed, and there is very little waste.

In the manner we have shown, from 40 to 80 cubic metres of rock may be detached by charges of nitroglycerine.

We trust to have shown by this notice the possibility of reconciling the employment of nitroglycerine with every desirable guarantee for public safety.—*Lond. Chem. News*, Aug. 10, 1866, from *Comptes Rendus*, t. lxiii. p. 189.

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### EXPERIMENTS ON THE ACTIVE PRINCIPLE OF HYOSCYAMUS.

BY WILLIAM A. TILDEN, F.C.S.

The plants of the Natural Order *Solanaceæ*, to which the *Hyoscyamus* belongs, present in general well-marked narcotic properties, and their active principles have, for the most part, been pretty completely studied. Henbane, however, seems to have been comparatively neglected, notwithstanding that it is in common and extensive use in the form of extract and tincture. It was on this account that I undertook some experiments upon the chemistry of this plant, hoping to have been able to establish the existence or non-existence of the alkaloid it was said to contain, and, if possible, to add to our existing knowledge by submitting the base itself and some of its compounds to analysis. The former is the only part of my original intention that hitherto I have been able to carry out. Either from the excessively minute quantity of the principle contained in the plant, or from its facility of decomposition when under the influence of chemical agents, I have been able to prepare at present a quantity only sufficient for its identification, and for making out some of its principal reactions.

I first of all attempted to prepare "hyoscyamine" by operating upon the seeds of *Hyoscyamus niger* by the process adopted by Geiger, and described in the fourth volume of Gerhardt's "Chimie Organique." In this manner, however, I obtained only equivocal results. I then made another experiment upon the seeds, employing the process recommended by Sonnenschein for the detection and elimination of organic bases. This process is

briefly as follows: The juice of the plant is collected, acidified with sulphuric acid, and heated to coagulate albuminous matter, or an extract is prepared by means of acidulated alcohol or water; by either plan a liquid is obtained, which is evaporated to a small bulk, allowed to stand, if necessary again filtered, and then mixed with excess of the acid mixture of phosphate and molybdate of sodium, for the preparation of which directions are given.

A precipitate is formed which contains the base in combination with the "phospho-molybdic" acid; it is collected, slightly washed, introduced still moist into a flask, and excess of caustic baryta added; a cork is then fitted, and heat applied. Should volatile bases be present, they are distilled into a set of bulbs containing dilute hydrochloric acid.

The non-volatile bases which remain are afterwards obtained by rendering the excess of baryta insoluble by a stream of carbonic acid, and then extracting with alcohol, which gives a solution of the base nearly in a state of purity. Here, again, I was unsuccessful, possibly because the hyoscyamine was altered by the caustic earth, with evolution of ammonia, a kind of change to which it is very subject.

I next procured a quantity of freshly-prepared extract of the leaf, which was kindly furnished me from one of the first pharmaceutical establishments in London. Half a pound of this extract (corresponding to about 14 lb. of the leaves) was dissolved in about three pints of water, mixed with a very small quantity of milk of lime, and filtered; to the clear liquid was then added carbonate of potash till it was strongly alkaline, and the whole thoroughly agitated with about a pint of chloroform. After standing all night, the chloroform subsided as a slightly greenish oil, which was separated by a funnel, filtered into a bottle, shaken up with some water acidulated with sulphuric acid, and then the chloroform recovered. This aqueous liquid gave an abundant precipitate with Sonnenschein's reagent; it was rendered alkaline with carbonate of potash, and shaken up with ether. The ethereal solution contained all the base, as was indicated by the fact that the aqueous portion, upon reacidification, no longer gave a precipitate with the phospho-molybdate. The ether, which was colorless, was then shaken up with acidulated water,

and the whole distilled in a water-bath. The acid solution remaining gave an abundant yellowish precipitate with *Sonnenschein's* reagent; neutralized with bicarbonate of soda, a dirty white precipitate with tannin, soluble in acetic acid; a yellow flocculent precipitate with chloride of gold; a brown precipitate with solution of iodine in hydriodic acid; an orange-yellow precipitate with protochloride of iodine; no precipitate, however, was observable either with perchloride of platinum or with solution of corrosive sublimate.

The base itself is a substance very soluble in alcohol, ether, chloroform, and even in water. Its aqueous solution possesses a strong acrid and bitter taste, and when suffered to evaporate spontaneously over oil of vitriol, has been observed to crystallize in radiating groups of needles, though this is not always the case, and it is generally obtained as a colorless gummy mass. It has a slight odor quite different from that of the plant, and is very decidedly alkaline to test-paper. Caustic alkalies destroy it rapidly, especially on application of heat, the solution becoming brown, and an alkaline vapor, probably ammonia, being evolved. Several of the characters here described agree with those given by Geiger, and mentioned in the "Organic Chemistry" of Gerhard.

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Mr. GROVES had made some experiments upon this alkaloid a few years since. His method of operation had differed from the author's. He boiled the leaves of *hyoscyamus* with olive-oil, and then agitated the product with hydrochloric acid and water. From this he obtained a small quantity of a liquid principle with alkaline properties, which he regarded as the active constituent of this drug.

Dr. ATTFIELD thought that after this statement we must recognize two principles as being present.

Mr. REYNOLDS suggested that the root should be used in future experiments.

Mr. SUTTON alluded to Professor Donovan's experiments as showing that the tincture of henbane was an inert preparation. He had swallowed it in doses of half an ounce without finding any inconvenience.

The PRESIDENT remarked that the physiological question could not be followed far in that room, from its merging into considerations that were more within the province of the physician.

Mr. DEANE gave it as his opinion that the sedative effects of even small doses of henbane were beyond doubt in many cases, and he could not help thinking that some peculiar circumstances must have influenced the cases in which very large doses had been taken with impunity.

Mr. CARTEIGHE had made some preliminary experiments on the active principle of henbane, and as far as they went they confirmed Mr. Tilden's results.—*London Pharm. Jour.*, Sept., 1866.

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#### ‘OBTAINING SPIRITS, &c., FROM WOOD.

Letters patent to William Edward Newton, sealed February 6, 1866, and dated August 31, 1865.

This invention consists in obtaining spirits of turpentine, rosin, tar, pitch, pyroligneous acid, gas, charcoal and wood naphtha, directly from pine wood by one operation.

The wood containing the resinous gum (pitch pine wood) is placed in iron retorts, which are closed up steam tight, and a stream of steam is let into the retort, which may at the same time be heated externally to expedite the process. As soon as the condensation of the steam ceases or partially ceases, the pressure of steam in the retort rapidly forces the heat through the mass of wood until the heat reaches from 300° to 320° F., when the valve which connects the retort with a condenser is opened, and the vapors containing water and spirits of turpentine pass over into the condenser and are condensed, the spirits rising on to the top of the water. This process continues several hours, the heat being gradually raised until the wood begins to char and forms acid, gas, and other products, at which time a large portion of the turpentine spirits have passed through the condenser. This process is hastened, and the yield of spirits in this part of the operation much increased, by reducing the pressure of the vapors in the retort to two or three pounds per square inch by the aid of air pumps and condensers, or otherwise. When the pressure is thus mainly removed, the evapora-

tion is so rapid that without the use of superheated steam it is difficult to keep up sufficient heat without charring the wood in some parts, which must be avoided as long as possible, as the quality of the spirits is very poor after charring commences until they have passed through difficult processes of refining. While this process is going on rosin is formed and runs down to the bottom of the retort, and is drawn out before the charring commences.

In using the vacuum or partial vacuum in the distillation, it will be found advantageous to shut off the connections of pump and condensers with the retort occasionally, to allow pressure of steam in the retort, which rapidly forces the heat through the wood again without charring it, unless the temperature of the steam is too high. The pressure of steam in the retort is not generally allowed to reach more than three or four atmospheres before it is again reduced. As soon as the yield of the spirits of turpentine becomes inconsiderable, the heat is raised and the charring commences, and as soon as this progresses rapidly, the steam may be nearly or quite shut off, and the acid formed will be much stronger than if the supply of steam be kept up during the entire distillation. The use of the vacuum or partial vacuum may be resorted to frequently throughout the entire distillation, the products coming over purer and at a much lower heat than they otherwise would. While the charring of the wood takes place, the vapors passing off consist of acid, wood naphtha, spirits, oil, tar, incondensable vapors, &c. A very advantageous way of separating the tar from the other vapors is to surround the condenser with a bath, heated to such a degree as to enable the vapors of the naphtha, acid, and spirits, together with the light oils, to pass through it without condensation, but cool enough to condense the tar, and so placed that the tar will run back into the retort while the vapors of the acid, naphtha, spirits, &c., pass on through another condenser, which may be cold, and separate the gas from the other products, or it may be heated sufficiently to carry the wood naphtha over with the gas into another condenser, where it is finally separated from the gas. The distillation is continued until the wood is thoroughly charred and the tar converted into a beautiful black lustrous pitch, the

oils being nearly driven therefrom. Should the rosin be left in the retort, it will also be converted into pitch. Care should be used not to heat the retort too highly on the bottom, as the pitch will be destroyed, if heated too much, by turning it into coke. It should be watched and drawn out as soon as sufficiently hard; whatever be the heat of the retort bottom. Should neither steam nor superheated steam be used in the distillation, the retort should be closed tightly at first, and the steam formed from the water of, the wood, and the other vapors, aid in increasing the pressure of vapors in the retort, and thus more equally distribute the heat through the wood. When the pressure in the retort reaches two or three atmospheres, the valve to the condenser may be opened.

Much more caution will have to be used to heat gradually and drive off most of the spirits before charring commences, if steam or superheated steam be not used to aid in heating the wood; these will be necessary if they are used.—*Lond. Chem. News*, Aug. 3, 1866.

#### ON VALERIANATE OF IRON.

By FRANCIS SUTTON, F.C.S., Norwich.

More than two years have passed since I accepted the subject of Valerianates for investigation, but owing to pressure of other business matters I have been until now unable to present any report thereon. That which I now have the honor to present to the Conference is not nearly so complete as I could wish.

With respect to valerianate of iron, the question proposed was—

What is the best process for the preparation of the salt? What are its characters? How may its purity be best ascertained?

We will first take into consideration the characteristics of the salt as described by previous authorities.

Pereira says, "Valerianate of iron, prepared according to the Dublin College, is a tile-red loose amorphous powder, with a faint odor and taste of valerianic acid. When heated it first fuses, then evolves its acid, and is converted into sesquioxide of iron. At a temperature of  $212^{\circ}$  it gives out part of its acid; it is

nearly insoluble in water, does not mix well with cold water, but repels it like lycopodium, and boiling water gradually extracts the acid from it. It dissolves in alcohol and acids."

Wittstein, who seems to have given some attention to the subject, says: "The valerianate of peroxide of iron obtained by precipitation is a dark brick-red loose amorphous powder, smelling and tasting faintly of valerianic acid; it will not mix with cold water even when rubbed continuously with it, but is instantly wetted by warm water, and gives up a portion of its acid to it." The same authority says: "The affinity between the oxide of iron and valerianic acid is so feeble that a gentle heat will suffice to abstract the greater portion of the acid, consequently the precipitation should only take place in the cold. Even continued treatment with cold water gradually abstracts the acid, and at the same time removes a little of the oxide of iron, so that the precipitate must not be washed as long as the water passing off has an acid reaction."

The descriptions of the salt here given agree pretty closely with the preparation as met with in commerce, with the exception of the solubility in alcohol. Although I have examined about a dozen specimens procured from various houses in London, and some in the provinces, I have found none, with the exception of a specimen sent me by an esteemed member of this Conference, Mr. Daniel Hanbury, which would dissolve in any appreciable proportion in alcohol.

The bulk of the samples examined consisted mainly of peroxide of iron, with small quantities of valerianic acid in the compound. No two preparations were precisely alike in composition, owing no doubt to the fact that as prepared in the way usually directed, and dried by artificial heat, the loss of valerianic acid was considerable.

The specimen sent me by Mr. Hanbury was in the form of a soft extract, smelling very strongly of valerianic acid, and of a transparent ruby color,—agreeing, in fact, precisely with a specimen I had myself prepared some months previously, but had not been able, owing to business engagements, to investigate. It is best, perhaps, here to say that when following the usual directions for preparing the salt, I had invariably obtained the brick-red powder described by Pereira and Wittstein.

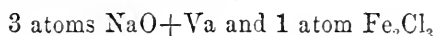
About three weeks ago I resolved to make a closer examination of these two preparations of valerianate of iron, namely, Mr. Hanbury's and my own, in order to see wherein they differed from the powdery kind usually found in the market. As they were both found to be identical in composition eventually, the description of one of them will suffice. I will describe the sample sent by Mr. Hanbury.

A small quantity of it was spread out thinly upon the lid of a platinum basin and weighed. The quantity was 13.42 grains; the first thing to be done with it was to remove any excess of moisture in the compound. Fearing that heat might dissipate some of the valerianic acid, the vessel was placed under the receiver of a large air-pump, together with a dish of sulphuric acid, and kept in vacuo for twenty-four hours, when the loss was found to be 2.7 grains, equal to 20 per cent. It was then exposed to the same influences twelve hours longer, but with no further loss. In order to ascertain whether any acid would be lost by artificial heat, it was then transferred to a water-bath, and kept at a temperature of  $212^{\circ}$  until the weight remained constant; the loss was then 3.41 grains, or very nearly 25 per cent., but no change had taken place in the appearance of the substance, and no apparent loss of acid by smell or otherwise. It had now lost all stickiness and become quite firm, so that it might readily be chipped off the vessel in thin transparent scales, like the usual citrate or tartrate of iron. A few of these scales were treated with alcohol, and were found to dissolve readily to a clear deep ruby liquid, but they were quite insoluble in water, and if water is added to the alcoholic solution the valerianate is immediately precipitated.

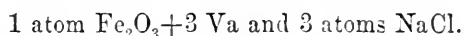
A quantity of the dry scales, weighing 9.1 grains, were then gently heated over a gas lamp, when they immediately began to melt, and give off copious fumes of valerianic acid, which readily ignited and gave a yellow brilliant flame. The residue, which appeared to consist of oxide of iron, weighed 2.31 grains; this was dissolved in a little hydrochloric acid, and the oxide of iron precipitated with ammonia. The weight of precipitate so obtained was 2.03 grains; the loss of weight between this and the ignited residue was due to sulphate of soda not thoroughly washed out of the valerianate.



I had no time to ascertain the quantity of valerianic acid actually present in the salt; but assuming that the loss from ignition was due to this acid alone, the formula of the salt would be as near as possible  $\text{Fe}_2\text{O}_3 + 3 \text{Va}$ , or a neutral anhydrous valerianate of peroxide of iron, containing three equivalents of valerianic acid = 279, and one equivalent of oxide of iron = 80; and this is the formula given by Wittstein, but which he says he was not able to produce, his explanation being as follows: "If a neutral solution of valerianate of soda is added to one of perchloride or any persalt of iron, a dark brick-red precipitate of valerianate of iron is formed, together with a sulphate or chloride of sodium, according to whichever iron salt has been used. In the case of perchloride of iron—



form



The neutral compound of valerianic acid described above does not, however, precipitate," he goes on to say, "but decomposes as soon as formed into a basic salt, in which, if the formula of the neutral salt is tripled, two atoms of acid are replaced by two atoms of water, forming a salt  $3 \text{Fe}_2\text{O}_3 + 7 \text{Va} + 2 \text{HO}$  and free valerianic acid, which, holding a portion of the basic salt in solution, gives to the supernatant liquor a slightly yellowish-red color." This basic salt is therefore the substance generally found in commerce, and I suppose is the only valerianate of iron which it has been hitherto thought could be obtained. The neutral valerianate is in ruby scales, will dissolve in its own weight of alcohol, and will bear heating to a temperature of  $212^\circ$  without decomposition. Not only in these respects but in appearance it differs completely from the brick-red powder hitherto known to us, and I doubt not will be found a much more reliable article for medicinal use.

The next question for our consideration is the preparation of the salt, and herein seems to lie the secret of the difference between one salt and the other. My experiments in this matter have not been so extensive as I could wish, but so far as they go they seem to show that the use of dilute solutions of valerianate of soda and iron necessitate the production of the basic salt, and *vice versa*,

with concentrated solutions. Another thing is of great importance, namely, that the valerianate of soda used should be entirely free from carbonate or caustic soda, a thing of rare occurrence with the usual commercial article apparently, more especially the carbonate; this may be known at once by its solution effervescing with an acid. If the valerianate of soda is contaminated in this way, the result obtained is unsatisfactory, owing to the admixture of hydrated oxide of iron.

Mr. Hanbury, in writing to me respecting the preparation of the salt, says; "We prepare it by decomposing a strong solution of persulphate of iron by one of valerianate of soda. Upon mixing the solutions a copious precipitate of an extractiform substance of a brick-red color is formed, with which is mixed a considerable quantity of sulphate of soda in small crystals. The precipitate is easily washed by kneading it in distilled water until the latter almost ceases to be affected by a solution of baryta. The resulting product requires no drying beyond the pouring off, as far as possible, of the water which somewhat gradually exudes from the mass; it remains in the form of a soft extract, which becomes harder after some months. We never attempt to dry it."

The method I have adopted myself in preparing the specimen now before you is, to take any convenient quantity of valerianic acid which is to be exactly saturated with a concentrated solution of carbonate of soda, heating the mixture in a water-bath so as to dispel all the carbonic acid; the fluid is then suffered to cool and into it is poured, as long as any precipitate is produced, the liquor ferri persulphas of the British Pharmacopœia,—about the same quantity by measure is required of the iron solution as has been used of valerianic acid; after some little mixing with a glass rod the precipitate settles down into a semi-fluid extract, which may be repeatedly washed with distilled water by a sort of kneading process, until the sulphate of soda is entirely removed; it is then spread out as thinly as possible upon glass or porcelain plates, and suffered to dry either by simple exposure to the air or by a gentle heat, then chipped off and preserved in bottles. The salt so obtained is not in the slightest degree deliquescent.

The best test of its purity is its complete insolubility in water and the ease with which it dissolves in spirit of wine.

*Valerianate of Zinc.*

The question proposed for solution in the list of subjects now under the notice of the Conference in connection with this substance is : Describe an easy method of determining the purity of valerianate of zinc as found in commerce ? In answer to this, I wish to say that I have not had time to carry out any great number of experiments on the subject, but I find that pure valerianate of zinc dissolves readily in a dilute solution of citric or tartaric acid, without separation of the valerianic acid, as is the case when sulphuric or hydrochloric acid are used. Oxide of zinc is insoluble in dilute vegetable acids, so that supposing a sample were tested which had been made by rubbing up valerianic acid with oxide of zinc, the specimen would remain insoluble. If acetate of zinc had been used as a substitute, this would dissolve, but it would also dissolve in water. Therefore, if a specimen is tested and found to be insoluble in water but dissolves pretty readily in a cold weak solution of citric or tartaric acid, we may infer that the preparation is pure.—*London Pharm. Jour.*, Sept., 1866.

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DENTIFRICES.

BY DR. C. E. FRANCIS.

Read before the Brooklyn Dental Association, April 4th, 1866.

From *dens*, a tooth, and *fricaro*, to rub.

This term is applied to preparations used for cleaning the teeth and tending to their preservation. Numberless preparations under the name of dentrifices have been spread before the public, and numerous have been the substances employed in their manufacture.

Nearly every pharmacist in the land has from one to a dozen preparations for the teeth to offer his customers, and every vender of cosmetics has some favorite nostrum to recommend. They are in the form of *powders*, *pastes*, *soaps* and *lotions*. Many of these preparations are undoubtedly of benefit to those who are in the habit of using them, and many of them perhaps do more mischief than good. How long a period dentifrices have been in use, I am not able to say, but we find formulas for tooth-

powder in very antiquated works. Like most of the old order of prescriptions, these at the present time look somewhat absurd. Many of you probably have noticed an old formula quoted by Goddard in his "History of the Teeth." For the benefit of those who have not seen it, I will repeat it; so if anybody present desires to copy for future use, he can now have the opportunity of doing so. It reads thus:

"Take the head of a hare and three mice; burn and reduce them to powder, and mix with an equal weight of powdered marble." Here, says Goddard, you have animal charcoal and prepared chalk with a vengeance. This prescription is said to be over two thousand years old, and is claimed as having originated in the fertile brain of old father Hippocrates. There are many prescriptions of more modern date which seem equally ridiculous. Even in Harris' works we find a curious compound known as "Beaumer's Dentifrice." It is this: Take of powdered pumice-stone, red earth, and prepared coral, *aa* ʒi; dragon's blood and cream of tartar, *aa* ʒss; powdered cinnamon, ʒij; cloves, grs. xxv. M. The same author also gives us a formula for what he terms an *aromatic powder*, composed of Peruvian bark, powdered galls, chalk, and orris root, in nearly equal proportions. I imagine the galls and Peruvian bark a decidedly aromatic preparation, well calculated to tempt children to use freely. I will quote one other from Harris, called "Lelande's Electuary Dentifrice." Take of pumice-stone, dried bones, and red coral, *aa* ʒij; calcined alum, orris root, and powdered cinnamon, *aa* ʒij; rock alum and cochineal, *aa* ʒi. Add to this abomination a sufficient quantity of Narbonne honey to make a thin paste. Allow it to ferment forty-eight hours, and flavor with tincture of musk and cloves. Goddard gives a formula from Prof. Hufeland: Peruvian bark, ʒi; red sanders, ʒiv; and alum, ʒi. Flavor with oil of lemon.

A detersive powder from the celebrated Maury reads thus: Magnesia carb., lbi; cream tartar, lbi; sulph. quinia, ʒv; cochineal, ʒiss; ol. pip. m., ʒiv; oil cinnamon, ʒij; neroli, ʒij. M.

A "Polish Dentifrice" contains ammon. mur., powdered catechu, myrrh, Peruvian bark, and orris root. This would be

so agreeable to the taste that I would advise you all to import a quantity at once. I might give you prescriptions for dozens upon dozens of dentifrices that have been recommended by as many different individuals who have prepared them, did I think you would be benefitted by such a rehearsal. It may not be amiss, however, to give a list of the various substances which enter into their combination. I will name them alphabetically: alum, bole Armen., ashes of tobacco, ammonia mur., borax, bone dust, bark, red, pale, and yellow, Quillia bark, bismuth, benzine, chalk, charcoal, cuttle fish, camphor, catechu, cochineal, carmine, cardamoms, cinnamon, cloves, cream of tartar, coral, dragon's blood, galls, gaultheria, guaiac, honey, krameria, kino, lime, magnesia, myrrh, orris root, oyster shell, pellitory, pumice-stone, soap, white and Castile, soda, salt, sugar, red sanders, red earth, rose pink, tannin.

Some of these substances are but seldom used, and many others are of little account. The most popular substances, or those in common use for powder, are orris root, yellow bark, gum myrrh, chalk, and soap. These few articles, combined in various proportions, probably form the substance of at least two-thirds of all the tooth-powder used.

Tooth pastes are usually composed of orris root, pumice, chalk, etc., combined with honey. A once famous, but repulsive looking compound, was charcoal and honey; and it worked wonders in its own peculiar way, as we shall presently see. The most popular lotions are of the saponaceous order and highly flavored. The old order of mouth-washes were generally composed of tincture of myrrh, bark, camphor, etc. The everlasting sozodont, which is advertised on every fence and rock for fifty miles around us, is supposed to be an aromatic tincture of Quillia saponaria, or soap bark, from an evergreen tree growing in Chili. Of course I cannot say positively that it is such. However, a very nice lotion may be prepared from this bark; but just allow me to say at this point that pure, sweet *soap* is fully equal to any *fluid* preparation that has ever been prepared for cleansing the teeth. But soap alone is not all that we desire. It has not sufficient body for a perfect dentifrice. The same may be said of all fluid preparations.

In forming a dentifrice we have several things to consider. Admitting that some preparation of this sort is required, let us see what will best subserve our purpose and present the least number of objections. In the first place, tooth-powder should be pleasant to the taste, that it may be used freely by both old and young. It should also be as nearly *soluble* as possible. I contend that charcoal, pumice-stone, cuttle fish, and similar substances are unfit for common use. The harsh, insoluble particles are forced between the teeth and beneath the margin of the gums, forming a base for the deposit of salivary calculus, which as it concretes severs the membranous connection. The gums are thus kept in an irritated condition; the alveolar process becomes exposed to the action of destructive agents, consequently absorption takes place; the teeth loosen and fall out. I have known cases where particles of charcoal have remained imbedded beneath the surface of the gums for upwards of five years after its use had been abandoned. So much for gritty substances.

Now as regards Peruvian bark and gum of myrrh. They are less objectionable, but I think their properties in this connection much over-rated. We do not need them in tooth-powder. They are unpleasant to the taste, bitter. Being insoluble in water, you get little or no medicinal effect; and where a medicinal preparation is desired, have a suitable wash prepared, adapted to the particular case, to be used in connection or alternately with the powder.

The best *base* for tooth-powder is pure precipitated chalk. It is entirely soluble in acetic acid. Borax is one of the very best of ingredients to combine with it. It tends to allay irritation of the mucous membrane, and imparts a peculiar sweetness to the mouth.

A simple and very excellent dentifrice may be made of prepared chalk and old white Windsor soap finely powdered, about six parts of the former to one of the latter. My own favorite dentifrice, which I both use and recommend, is simple and pleasant to the taste, and seems to answer every purpose that can be expected of a dentifrice for every-day use. It is this: R creta preparata, lbsij; powdered borax and orris root, lbi; cardamom seeds, ʒij; white sugar, lbi. Mix. Flavor with either

ol. rose, ol. gaulth., neroli, or jasmine. This of course is a mere matter of taste. If color is desired, one pound of rose pink may be added, and as much less of the chalk used. Tooth-powder should be thoroughly triturated in a wedgewood mortar, and finely bolted. The objects of its preparation and use are, to keep the teeth perfectly clean, to neutralize any fermented matter secreted in the interstices, to allay irritation of the gums, and to correct fetid breath. It should be used sufficiently often to keep the mouth in good condition, even though it be once or twice a day. Prepared in a simple manner no fears need be entertained that the teeth will wear out from its frequent use. As it dissolves readily, it must of course be used as dry as possible, and will keep best in well-stopped glass jars. That there is a necessity for a good and suitable dentifrice (in this present generation) to assist in the preservation of human teeth, very few close observers will deny. My own observation has led me to believe that scarcely any person can have a clean mouth without its use. I know that it is argued by those who differ from me in this respect, that horses, sheep, and cattle do not require the use of a dentifrice to keep their teeth from decay or to insure them a sweet breath. This argument, so far as it goes, is very good, but it does not answer in our case. Horses and sheep do not live on hot mixed food as do their more enlightened masters, neither did their progenitors crave such unnatural diet. They also possess by inheritance a good sound set of masticators, and if they could follow out their own natural inclinations would so live as to keep their teeth and whole physical organization in a state of perfect health.

Do you not suppose that if our domestic animals, and their progenitors for a thousand years back, had been compelled to resort to the same sort of diet that we and our ancestors have so long indulged in, that they would also be cursed with rotten teeth and foul breaths? Examine the teeth of a poor cow that has been fed on hot distillery slops for even a few short years, you will find a very different mouth from that possessed by an animal who takes the cool, fresh grass from a country meadow. Look into the mouths of the many little children who daily enter our offices, and what do we behold? Children at ten, six, or even

three years of age ; their little "pearly gems" appear more like a miniature array of mouldering tomb-stones, dilapidated, jagged, and broken ; frequently emitting an odor so foul as to compel one to stand at a respectable distance while viewing the ruins. Look also into the mouth of an adult who pays no attention to the cleanliness of his teeth ; notice the discolored remnants of a once perfect set of dentures ; see the huge scales of calcareous deposit encircling the necks of the teeth, or nearly investing their entire crowns ; observe the tumid condition of the gums, and how the filthy calculus has forced them to recede, and it is no wonder they recede at the approach of such an offensive accumulation. I do not say that the use of a tooth-brush and dentifrice will positively insure the teeth against decay, but a habitual cleansing process will greatly prolong their existence. I have heard it asserted that teeth are *worn out* by being cleansed. Even were this so, they had better wear out than rust out, or, as the old saying reads, "die clean if you will not live clean." But this is not apt to be the case. I have seen but a very few persons in my whole life whom I could conceive had injured their teeth by too much brushing, but have seen hundreds upon hundreds whose teeth were going to utter destruction from lack of care and tidiness. I do not believe in straining at the gnat and swallowing the camel. *Cleanliness*, gentlemen, *cleanliness* is next to godliness. Teeth should be brushed night and morning, particularly at night, for it is during the night that teeth are most ready to decay. During the day, the movements of the tongue, the fresh secretions of saliva, and the act of mastication, all tend, in a measure, to preserve the teeth ; but during the night, little or no saliva is secreted, and particles of food filling their interstices being so long subjected to a moist and heated condition, rapidly ferment, and the fluids of the mouth are thus vitiated, inducing disease and decay.—*Dental Cosmos, Philada.*, Aug., 1866.

#### THE MANUFACTURE AND PROPERTIES OF ANILINE COLORS, AND THE BODIES USED IN THEIR PREPARATION.\*

Memor presented to the Société Industrielle de Mulhouse at the meeting of May 31, 1865.

By MM. DEPOULLY, Brothers.

1. *Oils used in making Commercial Aniline.*—The source



which furnishes oils containing benzol and toluol is coal tar, which is produced in making coal gas.

In the distillation of these tars the first product is an oil lighter than water, commercially called "light oil," and containing—

1st. Neutral liquid hydrocarbides, benzol, toluol, cumol, &c., and a little solid hydrocarbide naphthaline.

2d. Phenols, bodies holding at the same time both alcohols and acids, phenic and cresylic acids.

3d. Very small quantities of alkaloids, aniline, picoline, quino-line.

To extract from these oils the principles used in making aniline colors, it is first necessary to separate the phenols; this result is obtained by agitating the oils with small quantities of caustic soda at 40° Baumé, or even more concentrated. If we separate the watery layer containing the phenols in combination with soda, this operation twice repeated completely frees the oils from phenols.

Sometimes, before this operation, the alkaloids are removed from the oils by being rapidly agitated with a small proportion of sulphuric acid.

These washings should be terminated before new rectifications are commenced, for the naphthaline separates much more readily by a redistillation when neutral oils are operated upon.

It then merely remains to separate the benzol and toluol from their homologues, the other liquid hydrocarbides.

We generally operate by fractional distillation—that is to say, by collecting all that is distilled between 80° and 120°, and this portion is sold under the name of benzol, and serves in the making of aniline.

Benzol is usually sold with a standard of distillation fixed beforehand, either at 90 per cent. or 60 per cent.—that is to say, 90 or 60 per cent. distilling below 100° C.

During the last few years benzol at 90 per cent. has been most in demand, but it has lately been found that aniline made with benzol at 60° gives the greatest yield of coloring matters.

These benzols are composed almost exclusively of two bodies—benzine and toluol.

Benzine,  $C_{12}H_6$ , distils at 80°; treated by nitric acid it gives

nitrobenzine  $C_{12}H_5NO_4$ , distilling at  $213^\circ$ , which by reducing agents gives aniline  $C_{12}H_7N$ , distilling at  $182^\circ$ .

Toluol,  $C_{14}H_8$ , distils at  $114^\circ$ ; by nitric acid it gives nitrotoluol,  $C_{14}H_7NO_4$ , which forms toluidine,  $C_{14}H_9N$ , distilling at  $198^\circ$ .

In this series of homologous hydrocarbides, benzol, toluol, xylol, cumol, cymol, the densities diminish in proportion as the equivalent and the boiling-point rise; and this law holds not only for hydrocarbides, but for their nitrogenized derivatives, for the alkaloids derived from them, and also for the corresponding phenols.

Thus a hydrocarbide distilling at  $80^\circ$  will have a density of 0.885; of another, distilling at  $110^\circ$  or  $114^\circ$ , the density will be only 0.870.

The density of a nitrobenzol distilling at  $213^\circ$  to  $220^\circ$  would be 1.200 to 1.210, while that of a nitrotoluol distilling at  $220^\circ$  to  $230^\circ$  would be 1.180 to 1.190.

Pure aniline,  $C_{12}H_7N$ , distilling at  $182^\circ$ , would have a density of 1.028; pure toluidine,  $C_{14}H_9N$ , distilling at  $198^\circ$ , would have a density of 1.001 to 1.002.

Phenic phenol,  $C_{12}H_6O_2$ , is denser than cresylic phenol,  $C_{14}H_8O_2$ .

Neither pure aniline nor pure toluidine produces coloring matter.

The best results, both as to beauty and quantity, and with both red and violet, have been obtained with a mixture of 70 per cent. of toluidine and 30 per cent. of aniline—that is to say, 2 equivalents of the one, and 1 equivalent of the other. These proportions agree perfectly with the formula ascribed by Dr. Hofmann to rosaniline. The object in view is then to obtain a commercial aniline thus composed.

The fractional distillation of commercial aniline for this purpose is a difficult operation. The distillation of nitrobenzol is not only dangerous, but expensive. It is better to endeavor to separate the hydrocarbides serving for the fabrication of aniline. Though this is not the usual operation, it appears to us the only rational one if aniline with an unvarying composition is desired.

The first method of separating hydrocarbides is due to Mansfield, who, in 1848 and 1849, produced the hydrocarbides of coal-tar and their derivatives, and indicated a great many applica-

tions for them. This work cost him his life. Proposing to separate benzol from the light coal oils, Mansfield heated these oils in a still with the head kept surrounded with water. The vapors ascending into the head became condensed, and fell back into the still; and after a time the water surrounding the head, not being renewed, was heated to the boiling-point. From the time the water in the open jacket reaches a temperature of  $80^{\circ}$  the benzole no longer condenses, but passes on into the worm, while the other oils fall back into the still. When the water arrives at the boiling point, only benzole passes over; after a time nothing passes, and all the benzole is separated.

This complete separation is founded on the boiling-point of water, intermediate between that of benzol,  $80^{\circ}$ , and that of toluol,  $114^{\circ}$ .

Mansfield tried to separate only benzol. The operation might easily be modified so as to separate toluol in a similar manner; it would suffice, the benzol once separated, to replace the water by some liquid—a saline solution, for instance—maintained at a constant level, and with a boiling-point intermediate between that of toluol and that of xylol.

Mansfield also tried to separate benzol with the apparatus used for the rectification of alcohol. Several patents have been taken out with the same idea, amongst which we will mention only M. Ch. Coupier's, who has effected the separation of benzol and toluol by means of an ingenious apparatus patented by him. We have seen various products from his works at Poissy, consisting of pure benzol and aniline, and nearly pure toluol and toluidine.

Some researches, for the purpose of previously separating the oils of coal-tar in an exact and economical manner, are much required, and would lead to great progress in the fabrication of aniline colors.

Another reason for insisting on this point is the considerable difference in the manner in which toluol and benzol behave with regard to nitric acid, when it is desired to transform them into nitrobenzol.

Toluol is attacked with greater difficulty; mixtures of sulphuric and nitric acids must be modified before treating this body.

In this series, in proportion as the equivalent is raised, the

action of nitric acid becomes more violent, especially more oxidizing, more destructive, forming nitrogenized bodies more easily; indeed, great precautions are necessary in obtaining nitrogenized derivatives from the higher hydrocarbides.

Here, then, is a cause of loss, and of the formation of secondary products. In a mixture of benzol with other oils there is a risk of destroying a part of these oils or of leaving part of the benzol unattacked.

Moreover, is toluol a perfect homologue of benzol? The action of chlorine on these two bodies is not the same; with benzol it produces chlorides without eliminating hydrogen; with toluol it produces chlorinated toluols, the chlorine substituting itself for one or more atoms of hydrogen.—*Chemical News*, August, 1866.

To be continued.

#### DEPARTMENT OF THE MOST IMPORTANT MEDICINAL ALKALOIDS WITH REAGENTS, AND A SYSTEMATIC METHOD OF EFFECTING THE DETECTION OF THESE SUBSTANCES.

(From PROF. C. R. FREZENIUS' Manual of Qualitative Analysis.)

NOTE.—In commencing the reprinting of the article on the department of alkaloids, at page 447 of our September number, published by Prof. A. Wadgymer, of St. Louis, in the *Medical Reporter* of St. Louis, (April and May, '66), we, as well as others, believe it to be, as it purports to be, an original article, properly to be credited to Prof. Wadgymer; but we find that it is almost wholly a plagiarism from Dr. C. R. Frezenius' Manual of Chemical Analysis. Compared with the recent American edition of Frezenius', we find a few paragraphs and foot-notes omitted, due probably to the use of the 7th instead of the 11th, or latest German edition. Prof. Wadgymer also omits the chapter on the volatile alkaloids, which may not have been contained in the earlier edition of Frezenius. Under these circumstances we feel best satisfied to credit the continuation of the article to Prof. C. R. Frezenius, and take it from the last American Edition of Prof. Johnson, of Yale.—ED. AMER. JOURN. PHARM.

*Third Group.*—Non-volatile alkaloids which are precipitated by potassa from the solutions of their salts, and do not redissolve to a perceptible extent in an excess of the precipitant; but are not precipitated from (even somewhat concentrated) acid solutions by the bicarbonates of the fixed alkalies; Strychnia, Brucia, Veratria.

a. STRYCHNIA, or STRYCHNINE ( $C_{42}H_{22}N_2O_4 = Sr.^+$ )

1. Strychnia appears either in the form of white brilliant rhombic prisms, or, when produced by precipitation or rapid evaporation, as a white powder. It has an exceedingly bitter taste. It is nearly insoluble in cold, and barely soluble in hot water. It is almost insoluble in absolute alcohol and ether, and only sparingly soluble in dilute spirit of wine. It dissolves freely in amyl-alcohol, more especially with the aid of heat. It does not fuse when heated. It is exceedingly poisonous.

2. Strychnia neutralizes acids completely. The salts of strychnia are, for the most part, crystallizable; they are soluble in water. All the salts of strychnia have an intolerably bitter taste and are exceedingly poisonous.

3. *Potassa* and *carbonate of soda* produce in solutions of salts of strychnia white precipitates of STRYCHNIA, which are insoluble in an excess of the precipitants. Viewed under a microscope magnifying one hundred times the precipitate appears as an aggregate of small crystalline needles. From dilute solutions the strychnia separates only after the lapse of some time, in the form of crystalline needles, which are distinctly visible even to the naked eye.

4. *Ammonia* produces the same precipitate as potassa. The precipitate redissolves in an excess of ammonia; but after a short time—or if the solution is highly dilute, after a more considerable lapse of time—the strychnia crystallizes from the ammoniacal solution in the form of needles, which are distinctly visible to the naked eye.

5. *Bicarbonate of soda* produces in neutral solutions of salts of strychnia a precipitate of strychnia, which separates in fine needles shortly after the addition of the reagent, and is insoluble in an excess of the precipitant. But upon adding one drop of acid (so as to leave the fluid still alkaline) the precipitate dissolves readily in the liberated carbonic acid. The addition of bicarbonate of soda to an acid solution of strychnia causes no precipitation, and it is only after the lapse of twenty-four hours, or even a longer period, that strychnia crystallizes from the fluid in distinct prisms, in proportion as the free carbonic acid escapes. If a concentrated solution of strychnia, supersaturated

with bicarbonate of soda, is boiled for some time, a precipitate forms at once; from dilute solutions this precipitate separates only after concentration.

6. *Sulphocyanide of potassium* produces in concentrated solutions of salts of strychnia immediately, in dilute solutions after the lapse of some time, a white crystalline precipitate, which appears under the microscope as an aggregate of flat needles, truncated or pointed at an acute angle, and is but little soluble in an excess of the precipitant.

7. *Chloride of mercury* produces in solutions of salts of strychnia a white precipitate, which changes after some time to crystalline needles, aggregated into stars, and distinctly visible through a lens. Upon heating the fluid these crystals redissolve, and upon subsequent cooling of the solution the double compound recrystallizes in larger needles.

8. If a few drops of pure *concentrated sulphuric acid* are added to a little strychnia in a porcelain dish, solution ensues, without coloration of the fluid. If small quantities of oxidizing agents (chromate of potassa, permanganate of potassa, ferricyanide of potassium, peroxide of lead, binioxide of manganese) are now added—best in the solid form, as dilution is prejudicial to the reaction—the fluid acquires a magnificent blue-violet color, which, after some time, changes to wine-red, then to reddish-yellow. With chromate of potassa and permanganate of potassa the reaction is immediate; on inclining the dish, blue violet streaks are seen to flow from the salt fragment, and by pushing the latter about, the coloration is soon imparted to the entire fluid. With ferricyanide of potassium the reaction is less rapid; but it is slowest with peroxides. The more speedy the manifestation of the reaction the more rapid is also the change of color from one tint to another. I prefer chromate of potassa, recommended by Otto, or permanganate of potassa, recommended by Guy, as the most sensitive, to all other oxidizing agents. Jordan succeeded, with chromate of potassa, in distinctly showing the presence of  $\frac{1}{50000}$ th grain of strychnia. J. Erdmann prefers binioxide of manganese in lentil-sized fragments. Metallic chlorides and considerable quantities of nitrates, also large quantities of organic substances, prevent the manifestation of

the reaction or impair its delicacy. It is therefore always advisable to free the strychnia first, as far as practicable, from all foreign matters before proceeding to try this reaction. If the solution colored red (by binoxide of manganese) is mixed with from four to six times its volume of water, and ammonia is then added until the reaction is *nearly* neutral, the fluid shows a magnificent violet-purple tint; upon addition of more ammonia the color becomes yellowish-green to yellow, (J. Erdmann.) I have found, however, that this reaction is seen only where larger, though still very minute, quantities of strychnia are present.

9. Strong *chlorine water* produces in solutions of salts of strychnia a white precipitate, which dissolves in ammonia to a colorless fluid.

10. *Concentrated nitric acid* dissolves strychnia and its salts to a colorless fluid, which turns yellow upon the application of heat.

b. BRUCIA, or BRUCINE ( $C_{46} H_{26} N_2 O_8 = Br.^+$ )

1. Crystallized brucia ( $Br.^+ + 8 aq.$ ) appears either in the form of transparent right rhombic prisms, or in that of crystalline needles aggregated into stars, or as a white powder composed of minute crystalline scales. Brucia is difficultly soluble in cold, but somewhat more readily in hot water. It dissolves freely in alcohol, both in absolute and dilute, also in cold, but more readily still in hot, amyl-alcohol; but it is almost insoluble in ether. Its taste is intensely bitter. When heated, it fuses with loss of its water of crystallization.

2. Brucia neutralizes acids completely. The salts of brucia are readily soluble in water, and of an intensely bitter taste. Most of them are crystallizable.

3. *Potassa* and *carbonate of soda* throw down from solutions of salts of brucia a white precipitate of brucia, which is insoluble in an excess of the precipitant. Viewed under the microscope, immediately after precipitation, it appears to consist of very minute grains; but upon further inspection, these grains are seen—with absorption of water—to suddenly form into needles, which latter subsequently arrange themselves without exception

into concentric groups. These successive changes of the precipitate may be traced distinctly even with the naked eye.

4. *Ammonia* produces in solutions of salts of brucia a whitish precipitate, which appears at first like a number of minute drops of oil, but changes subsequently—with absorption of water—to small needles. The precipitate redissolves, immediately after separation, very readily in an excess of the precipitant; but after a very short time—or, in dilute solutions, after a more considerable lapse of time—the brucia, combined with crystallization water, crystallizes from the ammoniacal fluid in small concentrically grouped needles, which addition of ammonia fails to redissolve.

5. *Bicarbonate of Soda* produces in neutral solutions of salts of brucia a precipitate of brucia, combined with crystallization water; this precipitate separates after the lapse of a short time, in form of concentrically aggregated needles of silky lustre, which are insoluble in an excess of the precipitant, but dissolve in free carbonic acid (compare strychnia.) Bicarbonate of soda fails to precipitate acid solutions of salts of brucia; and it is only after the lapse of a considerable time, and with the escape of the carbonic acid, that the alkaloid separates from the fluid in regular and comparatively large crystals.

6. *Concentrated nitric acid* dissolves brucia and its salts to intensely red fluids, which subsequently acquire a yellowish-red tint, and turn yellow upon application of heat. Upon addition of protochloride of tin or sulphide of ammonium to the heated fluid, no matter whether concentrated or after dilution with water, the faint yellow color changes to a most intense violet.

7. If a little brucia is treated with from four to six drops of pure *concentrated sulphuric acid*, a solution of a faint rose color is obtained, which afterwards turns yellow. If from eight to twenty drops of sulphuric acid mixed with some *nitric acid* (p. 394) are added, the fluid transiently acquires a red, afterwards a yellow color. Addition of binoxide of manganese transiently imparts a red, then a gamboge tint to the fluid. If the fluid is then, with proper cooling, diluted with four parts of water, *ammonia* added to nearly neutral reaction, or even to alkaline reaction, the solution acquires a gold-yellow color, (J. Erdmann.)



8. Addition of *chlorine water* to the solution of a salt of brucia imparts to the fluid a fine bright red tint; if ammonia is then added, the red color changes to yellowish-brown.

9. *Sulphocyanide of potassium* produces in concentrated solutions of salts of brucia immediately, in dilute solutions after some time, a granular crystalline precipitate, which, when viewed under the microscope, appears composed of various aggregated polyhedral crystalline grains. Friction applied to the sides of the vessel promotes the separation of the precipitate.

10. *Chloride of mercury* also produces a white granular precipitate, which, when viewed under the microscope, appears composed of small roundish crystalline grains.

c. VERATRIA, or VERATRINE ( $C_{64} H_{52} N_2 O_{16}$ )  $Ve^+$ .

1. Veratria appears in the form of small prismatic crystals, which acquire a porcelain-like look in the air, or as a white or yellowish-white powder of acrid and burning, but not bitter taste; it is exceedingly poisonous. Veratria acts with great energy upon the membranes of the nose; even the most minute quantity of the powder excites the most violent sneezing. It is insoluble in water; in alcohol it dissolves readily, but more sparingly in ether. At 239° Fah. it fuses like wax, and solidifies upon cooling to a transparent yellow mass.

2. Veratria neutralizes acids completely. Some salts of veratria are crystallizable, others dry up to a gummy mass. They are soluble in water, and have an acrid and burning taste.

3. *Potassa*, *ammonia*, and the *mono-carbonates of the alkalies* produce in solutions of salts of veratria a flocculent white precipitate, which, viewed under the microscope, immediately after precipitation, does not appear crystalline. After the lapse of a few minutes, however, it alters its appearance, and small scattered clusters of short prismatic crystals are observed, instead of the original coagulated flakes. The precipitate does not redissolve in an excess of potassa or of carbonate of potassa. It is slightly soluble in ammonia in the cold, but the dissolved portion separates again upon application of heat.

4. With *bicarbonate of soda* and *bicarbonate of potassa* the

salts of veratria comport themselves like those of strychnia and brucia. However, the veratria separates readily upon boiling, even from dilute solutions.

5. If veratria is acted upon by *concentrated nitric acid*, it agglutinates into small resinous lumps, which afterwards dissolve slowly in the acid. If the veratria is pure the solution is colorless.

6. If the veratria is treated with *concentrated sulphuric acid*, it also agglutinates at first into small resinous lumps; but these dissolve with great readiness to a faint yellow fluid, the color of which gradually increases in depth and intensity, and changes afterwards to a reddish-yellow, then to an intense blood-red. The color persists two or three hours, then disappears gradually. Addition of sulphuric acid, containing nitric acid, or of binoxide of manganese, causes no great change in color. If the fluid is then diluted with water, and ammonia added until the reaction is nearly neutral, a yellowish solution is obtained, in which ammonia added in excess produces a greenish light-brown precipitate, (J. Erdmann.)

7. *Sulphocyanide of potassium* produces only in concentrated solutions of salts of veratria flocculent-gelatinous precipitates.

8. Addition of *chlorine-water* to the solution of a salt of veratria imparts to the fluid a yellowish tint, which, upon addition of ammonia, changes to a faint brownish color. In concentrated solutions chlorine produces a white precipitate.

9. *Cold concentrated hydrochloric acid* dissolves veratria to a colorless solution, which, on prolonged boiling, assumes a red color that finally becomes very intense and resembles that of permanganate of potassa. The colored liquid remains unaltered for a long time. This reaction is very sensitive. Trapp.\*

#### *Recapitulation and remarks.*

The alkaloids of the third group also are precipitated by many other reagents besides those above mentioned, as, for instance, by tincture of galls, bichloride of platinum, solution of iodine in iodide of potassium, phosphomolybdic acid, &c. But

\* *Polytechnisches Notizblatt*, 1863, 96.

as these reactions are common to all, they are of little importance in an analytical point of view.†

Strychnia may be separated from brucia and veratria by means of absolute alcohol, since it is insoluble in that menstruum, whilst the two latter alkaloids readily dissolve in it. The identity of strychnia is best established by the reaction with sulphuric acid and the above-mentioned oxidizing agents;‡ also by the form of its crystals—when thrown down by alkaloids—viewed under the microscope; and lastly, by the form of the precipitate which sulphocyanide of potassium and chloride of mercury produce in solutions of its salts. Brucea and veratria are not readily separated from one another, but may be detected in presence of each other. The identity of brucia is best established by the reactions with nitric acid and protochloride of tin or sulphide of ammonium, or by the form of the crystalline precipitate which ammonia produces in solutions of salts of brucia. Veratria is sufficiently distinguished from brucia and the other alkaloids which we have treated of, by its characteristic deportment at gentle heat, and also by the form of the precipitate which alkalies produce in solutions of its salts. To distinguish veratria in presence of brucia, the reaction with concentrated sulphuric acid is selected.

To these alkaloids I will add *salicine*, though this substance does not properly belong to the same class of chemical compounds.

† If the precipitate produced in the solution of a salt of strychnia by iodide of potassium containing iodine, is dissolved in spirit of wine mixed with some sulphuric acid and the solution is evaporated, strongly polarizing prismatic crystals of sulphate of iodide of strychnia are obtained. De Vrij and Van der Burg (*Jahresber v. Liebig, and Kopp, 1857, 602.*) Whether this reaction is characteristic for strychnia, can be known only after the optical properties of analogous compounds of the other alkaloids shall have been studied.

‡ The only substance which shows somewhat analogous reactions in this respect, is aniline. A. Guy has, however, called attention to the fact that aniline, treated with sulphuric acid and oxidizing agents, acquires a pale green color at first, which gradually deepens, and only then changes to a magnificent blue, which, after persisting some time, turns finally black.

## NOTES ON PLASMA.

### SALICINE ( $C_{26} H_{18} O_{14}$ .)

1. Salicine appears either in the form of white crystalline needles and scales of silky lustre, or, where the crystals are very small, as a powder of silky lustre. It has a bitter taste, is readily soluble in water and in alcohol, but insoluble in ether.

2. No reagent precipitates salicine as such.

3. If salicine is treated with *concentrated sulphuric acid*, it agglutinates into a resinous lump, and acquires an intensely blood-red color, without dissolving in the acid; the color of the sulphuric acid is at first unaltered.

4. If an aqueous solution of salicine is mixed with *hydrochloric acid* or *dilute sulphuric acid*, and the mixture boiled for a short time, the fluid suddenly becomes turbid, and deposits a fine granular crystalline precipitate (saliretine.)

(To be Continued.)

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## NOTES ON PLASMA.\*

BY MR. G. F. SCHACHT.

Early in the year 1858 a paper of mine was read before the Pharmaceutical Society, entitled "*Glycerine, a Proposed Substitute for Oils and Fats in Ointments.*"

The discussion which followed the reading of this paper (supposing the report of the *Journal* to have been correct) appeared to me at the time, as it appears to me now, by no means characterized by judgment or candor. It seemed to be assumed that the proposed substitute "plasma," was identical with a certain something else that had been tried and found wanting, and that therefore there was little hope for plasma. The two things, however, were not alike. Unfortunately, I was unable to be present on the occasion, and, as no defence for the proposition was volunteered by any other person, a verdict, on the whole adverse, was delivered by the learned critics. Notwithstanding this damaging circumstance, certain individuals, both in my own neighborhood and in other localities, were differently impressed, and, having given the preparation something of a trial, arrived at the conclusion to continue its use. And so, after eight years'

\* Read before the Pharmaceutical Conference, Nottingham meeting.

experience, I am not a little pleased to find plasma not only talked about, written about, and prescribed, but also that a proposition has been made by no less an authority than Dr. Redwood to introduce it into the next Pharmacopœia.

From the date of my paper (February, 1858) to the present moment I have made no further public allusion to the article; I may, perhaps, then be excused if I now once more obtrude it upon my fellow-pharmaceutists.

It is, perhaps, undesirable that I should follow every one who has expressed himself upon the matter; in referring, however, to the opinions and observations of a few, I trust to be understood to imply no disrespect for the labors of the rest.

I may, observe, as a general remark, that those who have written upon the matter express opinions favorable to the preparation; the objections to it have usually been uttered in conversations and discussions upon these more deliberately expressed opinions. The list of tangible objections, however, is not large; it amounts to no more than two. These are serious objections, I admit, if they really exist, but they are not numerous.

The first is, that the preparation becomes softer by exposure to the moisture of the air; and the second, that it is liable to become mouldy by keeping.

With regard to the first, I think we must admit that it is a difficulty. I pointed it out in my original paper, and I do not think there is any prospect of our being able altogether to obviate it. We must accept it as a property of all preparations of glycerine, and avoid exposure to moisture as much as possible. But I have not found this property of much practical inconvenience. I have kept plasma in a common covered pot for a long time without apparent change. Here is a sample kept in this way since December, 1865, and it is still of very good consistence. But if the article be really useful, there would be no more difficulty in preserving it in well-closed vessels than many others about which we have to be specially careful.

The second alledged objection to plasma is, that it becomes mouldy by keeping. This statement is backed by the authority of names that command respect. Mr. Dean and Mr. Squire

have both recorded this fact against plasma, and it is difficult to discredit anything advanced by observers of so large experience and of such well known carefulness. But without intending any contradiction of the observations of others, I am bound to assert that I never saw a particle of mould upon plasma, and that since 1858 I have never been more than a few days at a time without plasma in stock. It is possible the mould to which these gentlemen refer may have appeared upon some of the compound plasmas. I admit I have not kept many of these for any length of time, but such as I have kept—Plasma linci and Plasma petrolei—have remained as free from mould as simple plasma itself. I do not therefore feel disposed, as yet, to admit “a disposition to become mouldy by keeping” as a proved fact against plasma; but, on the other hand, am bold to assert that it has the but one weak point already admitted.

Though I have prepared plasma in batches varying from one ounce to twenty pounds, and have for experimental purposes occasionally modified my formula, I have found no advantage to result from any change, either in the proportions of the ingredients or in the selection of any particular starch granule. Some experimentalists have supposed considerable differences in the results to have attended the employment of different feculas. My own experience goes rather to constrain me to attribute all variations of result to slightly altered manipulation. For instance, if, after heating the mixed ingredients to the required temperature and for the required time, the vessel be removed from the fire and its contents allowed to cool without further stirring, they will become gelatinous and toughly elastic, a consistence very inconvenient for the required purpose, but by a little judicious stirring during the process of cooling this may be entirely obviated, and an excellent ointment-like consistence obtained. Again, I have observed the translucency of the result to depend a good deal upon the time the mixture is exposed to heat, and the amount of stirring during the last part of the process. I find arrowroot, tous-les-mois, and potato starch will all give equally good results under exactly similar circumstances; and, on the other hand, they all, under slightly modified circumstances, will yield inferior results.

My experience, therefore, leads me to suggest but little change in my original instructions, which were as simple as could well be—viz. : —“Take of starch-powder 70 grs., glycerine 1 fl. oz.; mix the ingredients cold, and heat to 240°, constantly stirring.” All I would add to that is, if the batch be large, say 10 lb. or 20 lb., it is better to escape the dreary task of constantly stirring so large a mass, whilst it is being gradually heated to 240° (which must be done if the starch be added.) This can be accomplished by mixing the starch with about one-twelfth of the glycerine, placing the remainder on the fire, and, when this has become heated to 260°, (which will involve no special attention), mixing all together and stirring till complete. I venture then to repeat my opinion that plasma, carefully made, is a very elegant and useful material, possessing features of undoubted advantage over the fats commonly employed for ointments, and is not liable to any serious inconveniences.

I wish now more particularly to refer to some of Dr. Redwood's remarks contained in his paper, “*On the Construction of a Pharmacopœia*,” (April 5, 1865), and more especially to the nomenclature by which he proposes to designate this solid preparation of mine and certain other classes of fluid compounds of glycerine. He introduces the matter by a kindly and favorable mention of plasma. He says (vol. vi., 2d series, p. 572:—

In external applications, also, some improvement has been made. The old form of ointment has often been referred to as one calling for improvement, for what can be more offensive than a rancid unguent smeared over the skin? The so-called ‘plasma,’ which was introduced by Mr. Schacht, of Clifton, in 1858, is certainly a great improvement in elegance and the absence of repulsiveness upon the forms previously used for similar purposes. This plasma, which is a solution of starch in glycerine, has now been in use for several years, and there appears to be but one objection to it, which is that, if exposed to the air, it absorbs moisture, and is then liable to become mouldy. But it has several recommendations, and it will probably

come into more general use as it becomes more extensively known."

He then alludes to a class of preparations in which glycerine acts as a useful solvent, and in which the resulting compounds still retain the fluid form of the solvent. After commending these also as a useful series of applications, he proceeds to criticise the names by which they have hitherto been called. He says:—

"If glycerine is to be thus used, it is desirable that we should have some name that could be conveniently applied in pharmacy as a generic name for solutions where it is employed as the solvent. Some names have been already proposed, but none of them appear to me unobjectionable. Solutions in glycerine have sometimes been called glyceroles, but this name is suggestive of a property the reverse of that which glycerine imparts. Glyceroleum cannot, therefore, be considered a suitable generic name for a class of preparations distinguished from olea and unguenta by the possession of entirely different characters. Then we cannot call them glycerides or glycerates, because these names are already appropriated as chemical names, having different significations from those here intended. I would suggest that the name glycemate might be suitably used for these preparations. This name has not yet been appropriated that I am aware of, and it seems to fulfil what is required. The word glycemate would be glycematum in Latin, and this would apply to solutions of substances such as I have named in glycerine. The solution of starch in glycerine, Mr. Schacht's Plasma, would be Glycematum Amyli, glycemate of starch. Under this name it would be included among other solutions in glycerine; but as this glycemate of starch may itself become the basis of a class of external applications, while others of the glycemates are applicable for different purposes, it would be desirable to have a name that could be used as a generic name for preparations of glycemate of starch with more active ingredients. Thus the glycemate of starch forms a good vehicle for the application of aconitia, atropia, &c., and what name should be applied to such? I would suggest that the name Glycematum Amyli should be abbreviated into Glycemylum, which would be a synonym for



glycemate of starch, and a generic name for preparations consisting of what is now called plasma, with the addition of other substances.

We should thus have—

*Glycematum Amyli*, Glycemate of Starch. Synonyms: *Glycemylum*, glycemyle, Plasma. Solution of starch in glycerine.

*Glycematum Aloës*, Glycemate of Aloes. Synonym: Glycerole of Aloes. Solution of Aloes in glycerine.

*Glycematum Boracis*, Glycemate of Borax. Solution of borax in glycerine.

*Glycematum Carbolicum*, Carbolic glycemate. Solution of carbolic acid in glycerine.

*Glycematum Gallicum*, Gallic glycemate. Solution of gallic acid in glycerine.

*Glycematum Tannicum*, Tannic glycemate. Solution of tannic acid in glycerine.

And then we might have—

*Glycemylum*, Glycemyle. Synonym: Plasma. Solution of starch in glycerine.

*Glycemylum Aconitiæ*, Glycemyle of Aconitia. Solution of aconitia in glycemyle.

*Glycemylum Atropiæ*, Glycemyle of Atropia. Solution of Atropia in Glycemyle, &c.

Now, I think the author's strictures upon the names glycerole, glyceride and glycerate are perfectly fair, and I agree with him in thinking they ought not to be used, but I cannot see that the new ones he suggests are one whit better. In the first place, the words *glycematum* and *glycemylum* are very much like each other, the difference not only being slight, but being also one that would by no means easily fix itself in the memory of the prescriber and dispenser. Here are two distinct forms of remedy as different in physical features as an "extract" differs from a "liquor" or an "aqua." Why, then, call them by names which sound and look so much alike? I admit that *glycemylum* suggests itself as a compound word of *glycerinum* and *amylum*, but then that does not necessarily imply that *glycemylum* is solid, for unless heated the ingredients would

remain fluid. But I do not at all see the etymological appropriateness of glycematum. A glycemate might certainly be a correct name for a compound of glycerine acid (did such a thing exist) and a base; but, as this is not intended, I can only suppose the word to be also a compound of glycerinum and pomatum. But that would rather suggest a solid, inasmuch as pomatums usually are solid. But Dr. Redwood applied this term to the fluid class of preparations.

I cannot help thinking that the Doctor has passed over the most simple, the most natural, and the most correct name for these fluid glycerines. When we dissolve small portions of foreign substances in water, we call the resulting fluids waters, aqua. A little oil of cinnamon dissolved in water constitutes cinnamon water, aqua cinnamomi. A little lime dissolved in water we call lime water, aqua calcis, &c. We do not find it necessary to increase the mystery of the matter by talking of an "aquate of lime," "aquatum calcis," "aquatum cinnamomi;" why not, therefore, call a solution of aloes in glycerine "aloes glycerine,"—Glycerinum Aloës—or a solution of tannin in glycerine Glycerinum Tannicum? Such a nomenclature would be too simple and obvious for confusion, and the whole series of medicated glycerines would lie together with the simple solvent at their head.

And with regard to the solid series—plasma and its compounds—I cannot help thinking they had better continue to be called by the name under which they were introduced. As god-father to the interesting stranger, I may perhaps be somewhat partial; but I think the name both euphonious and descriptive: it implies something to be spread; it is not more arbitrary than others we employ with great convenience, such as "tinctura" and "emplastrum," and it serves to discriminate peremptorily between the solid and the fluid forms of the glycerine applications.

If, then, these preparations are honored with places in the new Pharmacopœia, I hope they will appear under the easily-recognized names of "glycerina" and "plasmæ.—*Lon. Chem. News*, Oct. 5, 1865.

## Varities.

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*Heveone*.—M. Mathieu is announced as having discovered a new substance called Heveone, and which promises to become of important use in many of the arts.

It is a viscous vegetable fat obtained by the action of a high temperature upon a pure kind of caoutchouc.

This substance possesses great powers of adhesion to any surface to which it may be applied, and, as it does not oxidize nor alter in the air, it serves admirably to preserve iron or steel instruments and polished articles from rust or tarnish. It retains this property even when the coating is so thin as to be almost imperceptible.

Applied to stopcocks, pistons, screw connections and the like, it renders them at once beautifully mobile and perfectly tight; it does not dry or become sticky, nor does it attack brass or other metal work, as the generality of greases do.

Being quite impervious to water, heveone applied to articles made of leather, such as boots, harness, etc., after a few applications, renders them water-proof and supple; it also tends to preserve objects from decay. It is considered the best material to use for rifles, whether as a constituent of the greased wood, or to protect the interior of the barrel from rust; it is found to prevent fouling to a far greater extent than any other kind of grease, and renders the subsequent cleaning a matter of no difficulty.—*Friend's Review*.

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*Effects of the Bite of the Scolopendra heros (Centipede)*.—Communicated by H. C. Wood, Jr., M. D., Prof. of Botany in the University of Pennsylvania.

*Dear Doctor*:—I have recently received an account from a correspondent in Texas, Dr. G. Linceicum, of the effects of the bite of the centipede, which seems to me worthy of publication, as I have never met with a similar account before.

The species is the *Scolopendra heros*, Girard, which not unfrequently attains the length of eight inches, and a breadth of nearly an inch. Dr. Linceicum is too well known to lovers of natural science to necessitate my saying anything about his reliability; the language is his own.

"You wish me to give you as full an account of the symptoms following the bite of the centipede as I can, and ask me if I ever saw a case. Yes.

In the year 1850 I was called to a case six miles off, and when I arrived the little girl was dead. She had survived the bite five or six hours. The whole surface was dappled over with livid spots from the size of a dollar down to a five cent piece, and there was an elastic puffiness, giving the whole person an enlarged or fat appearance. She had been dead but

a few minutes when I arrived, and felt so soft and life-like, that I examined her very carefully, hoping I might find some indications that would encourage me to experiment a little, but the child was dead. The case occurred in this wise: the mother, Mrs. K., was combing her hair, and dropping her comb it fell through a crack in the floor near the wall. The little girl, who was about four years old, went immediately out to search for the comb, and running her hand through the fence rail underpinning, the centipede, which had been attracted by the comb, and had not time to get away, saw her little white fingers approaching the place where the comb had fallen, turned and made another plunge (for he is a beast of prey), and striking the child's thumb near the outer joint, ran up towards the hand, leaving a track on the thumb very similar to what a sharp, small spur would make were it rolled along on the skin. There were five little rosy holes made with the feet, and higher up on the thumb the grab of the caliper-like mandibles was plainly seen. The symptoms were, according to the mother's account, instant complaint, which grew rapidly worse, which was described by the child as being all over her. Vomiting of a pale yellow glairy matter supervened, which continued at short intervals with increasing violence, until the child, in a convulsive struggle, ceased to breathe.

Five other cases of centipede bites have occurred in this vicinity, none of whom died. The symptoms were the same as those described in the Keene child till the vomiting ensued; at this stage of its action the pain and suffering were checked in four of the cases; in the fifth case it was checked before it had run so far. The same remedies that will cure the bite of the rattlesnake seem to do no good in cases of centipede bite. From the Mexican Indians we have obtained the antidote, and it was that which was so successfully applied in the five cases named above. When properly prepared and administered, it entirely relieves the patient of all symptoms of poison in about four hours.

I did not see these cases myself, but they occurred close by, and I have no doubt as to their being correctly reported to me; two of them having occurred in the practice of my son Lucullus, who is a physician. The antidote is the roots of the *Tephrosia Virginia*, boiled in milk (sweet milk) and taken in doses of half a teacupful, and repeated at intervals of fifteen or twenty minutes. A good handful of the root, as long as the hand is wide, pretty well bruised, and boiled in a quart or three pints of sweet milk, is about the average preparation; but when the bite is a bad one, has been done an hour or two, and the patient is of a robust constitution, the preparation should be liberal. Though the *tephrosia* is a powerful agent, and, if carried too far beyond the antagonistic action of the poison, is, I presume, not entirely without danger, I have never known any bad symptoms to arise from its use.

The scorpion is of no consequence at all. I said all that is necessary about him in my last letter to you. He travels over all parts of our

houses, frequently dropping down upon us from the ceiling, and stinging us in bed. It frightens the women and children, but in all my long life, it has never happened in the circle of my knowledge, that any serious injury resulted from the sting of the scorpion, and the scorpion I speak of now is the true one."—*Am. Journ. Med. Sci.*, Oct., 1866.

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*Formula for Collodion.*—Dr. J. P. Maynard, who originally introduced this article to the profession, gives (*Boston Med. & Surg. Journ.*, Aug. 9, 1866) the following formula for its preparation best adapted for surgical purposes:—

"Take two parts of sulph. acid, sp. gr. 1.850, and one part nitric acid, sp. gr. 1.450. Mix them—allow the temperature to fall to about 100° Fahrenheit. Add to this, raw cotton, to point of saturation. Let it soak about one to two hours. Pour off the acids. Wash the cotton till litmus paper shows all acidity removed. Dry thoroughly. The cotton will now be found to be converted into a gum, completely soluble in ether of about .750 sp. gr., or in pure ether 3 parts and alcohol 95 per cent. 1 part. About 2 ounces of cotton thus prepared will make about 1 pint of collodion of proper consistency for surgical purposes. For photographic objects, a less amount will be sufficient. The conditions for success by this formula are simply precision in the details and careful manipulation, which a little experience will perfect."—*Am. Journ. Med. Sci.*, Oct., 1866.

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*Discovery of a Mammoth.*—At a late sitting of the Academy of Sciences a letter was received from M. de Baer, of St. Petersburg, announcing that a mammoth, still covered with its skin and hair, had been discovered in the frozen soil of Arctic Siberia. This discovery had been made in 1864 by a Samoyede in the environs of Taz Bay, the eastern branch of the Gulf of Obi. The news only reached St. Petersburg towards the end of 1865; but as the bodies of large animals will keep a long while in those regions, if they are not completely uncovered, and as this mammoth was still inclosed in the frozen soil, the Academy of St. Petersburg has, with the aid of the Russian Government, sent M. Schmidt, a distinguished palæontologist, to examine the animal and its position in the locality. It is hoped M. Schmidt will arrive before the decomposition is too far advanced, and that a correct notion may be obtained of the outer appearance of the animal, and also, from the contents of the stomach, of its natural food. The pre-historical figure of the mammoth drawn on a piece of ivory, found in a cavern of Périgord by M. Lartet, will then admit of verification.—*Med. News*, Aug., 1866, from *Med. Times and Gaz.*, April 28, 1866.

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*The Great Prize in Electricity.*—The French Government has issued an invitation to the savants of all nations to compete for the prize of 50,000 frs. which will be decreed five years hence to the author who shall have discovered the means of rendering Volta's pile economically applicable to

manufactures as a source of heat, to illumination, to chemistry, mechanics, or practical medicine, The *concears* will remain open for five years, dating from April 18, 1866.—*Med. News, Aug., 1866, from Med. Times and Gaz.*

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*Prepared Liquid Glue.*—Take of best white glue sixteen ounces ; white lead, dry, four ounces : rain water, two pints ; alcohol, four ounces. With constant stirring dissolve the glue and lead in the water by means of a water-bath. Add the alcohol, and continue the heat for a few minutes. Lastly pour into bottles while it is still hot.—*Drug. Cir., Oct., 1866.*

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*Marine Glue.*—Dissolve three parts of India rubber in thirty-four parts of coal-tar naphtha—aiding the solution with heat and agitation ; add to it sixty-four parts of powdered shellac, which must be heated in the mixture, till the whole is dissolved. While the mixture is hot it is poured upon metal plates in sheets like leather. When required for use, it is heated in a pot, till soft, and then applied with a brush to the surfaces to be joined. Two pieces of wood joined with this glue can scarcely be sundered.—*Drug. Cir., Oct., 1866.*

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*Preservation of Wood against Decay.*—A correspondent furnishes us an interesting article on the above subject, which want of space this week obliges us to condense. We merely give the important parts. After speaking of the advantages of charring wooden posts before setting, he says :—Scientific men have explained this superiority to reside in the peculiarity of charcoal for absorbing the gases arising from decaying substances. But charcoal retains this property but a short time unless kept from the air. The reason of this lies in its limited absorbing power. In less than twenty-four hours after being set, the charcoal becomes saturated, and is then entirely ineffective for protecting the wood. The cause of the preservative influence must then be sought elsewhere, and the following is my belief :—The microscope reveals the cause of decay as due to parasites feeding on albuminous substances. Dr. Schmoele gives the following conditions, all of which must be fulfilled before decay takes place : The presence of parasites or germs, albuminoids, moisture, free oxygen, together with a suitable temperature, and the absence of greater counter-acting influences. Now, charring wood dispenses with the two first conditions, for the heat required to char the outside coating is more than sufficient for decomposing the albuminous substances, and destroying all parasitic germs. A temperature but little above the boiling point would answer for this equally well. I come then to the conclusion that, for preserving wood, charring is quite superfluous, a much less heat answering equally well. On this idea, original I believe with myself, and which I claim as my invention, I base my plan for the preservation of wood. I propose to store the timber, of whatever description, in large stone or iron

boxes or rooms, through which I circulate currents of hot air or superheated steam, till each piece is heated to the required degree.

This process offers the following advantages: Greater simplicity, greater cheapness, requiring no expensive chemicals, greater expedition of the work.

As is well known, the albuminoids are highly hygroscopic, and in consequence expand or contract with every change of moisture in the air. Wood treated as above is no longer subject to such changes.—*Drug. Circ.*, Oct., 1866, from *Scien. American*.

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*Introduction of Shad in Southern Rivers.*—Dr. W. C. Daniell, writing from Savannah to the editor of the *Southern Medical and Surgical Journal*, says:

"I am gratified to say that I have fully established the White Shad in the Alabama River, where they are as large and as fine as our own shad.

"Now that it has become a fixed fact that shad prosper at the mouth of the Alabama River, we may readily infer that they will equally prosper at the mouth of the Mississippi River, and probably of all the rivers discharging into the Gulf of Mexico. I hope to test this in another year. I would have done so this spring, but that my fishermen disappointed me. As soon as I was satisfied that there were distinctive, though minute, differences between the shad of Savannah and the Ogeechee Rivers, I felt confident of establishing the White Shad in the Alabama River. These differences were pointed out by our fishermen in 1846, and 1848 I planted the fecundated eggs in a small tributary of the Etowah, and in 1851 or '52 the fish were taken in the traps at Wetumpka and Tuscaloosa."—*Drug. Circ.*, Oct., 1866.

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*A Powerful Microscope.*—The most powerful microscope ever constructed has been made by Messrs. Powell & Leland, and described in a paper read before the Royal Society of London, England. The power of this instrument is fully double any which had ever been constructed previously, and altogether supersedes what had before been considered the utmost attainable limit of perfection in this instrument. This powerful microscope magnifies 3,000 diameters with its lowest eye-piece, and 15,000 diameters with its piece of the highest power—the latter being equivalent to magnifying no less than 1,575,000,000, or making an object appear that number of times larger than it really is! How immensely must such an instrument increase our knowledge of the lower organisms; may it not even enable us, eventually, to determine the ultimate constitution of matter; it must at least greatly aid the scientist in his researches in that direction.—*Drug. Circ.*, Oct., 1866.

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*The Virtues of Borax.*—The excellent washerwomen of Holland and Belgium, who "get up" their linen so beautifully white, use refined borax

as a washing-powder, instead of soda, in the proportion of one large handful of powder to about ten gallons of boiling water. They save in soap nearly one-half. All the large washing establishments adopt the same mode. For laces, cambrics, etc., an extra quantity of the powder is used; for crinolines, requiring to be made stiff, a strong solution is necessary. Borax being a neutral salt, does not in the slightest degree injure the texture of the linen. Its effect is to soften the hardest water, and therefore it should be kept on every toilet table. To the taste it is rather sweet; it is used for cleaning the hair, is an excellent dentifrice, and in hot countries it is used, in combination with tartaric acid and bi-carbonate of soda, as a cooling beverage. Good tea cannot be made with hard water. All water may be made soft by adding a teaspoonful of borax powder to an ordinary-sized kettle of water, in which it should boil. The saving in the quantity of tea used will be at least one-fifth.—*Med. & Surg. Rep.*, Sept. 29, 1866, from *Druggists' Circular*.

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*Agates*.—The Reese River (California) *Reveille* says, that about three miles north of Ione there is an isolated mountain, some five hundred feet high, which is called Agate mountain. Its entire surface upon all sides from summit to base, is covered with agates and concretions, and on digging into the soil they are found like potatoes in a hill. The agates are usually oval and sometimes globular in form, and varying from one to four inches in diameter, and are beautifully banded and striped. In the hands of a skilful lapidary they could be fashioned into pleasing ornaments. The various concretions are found in great abundance, and many of them are particularly beautiful. In their sphericity they are sometimes found as perfect as a ball, though generally the spherical shape is quite distorted. They are hollow, and usually filled with crystals. On breaking them open their interior is often found to be irregularly hollow and lined around with a layer of quartz crystals, forming what is termed a geode—a “little crystal grotto.” Some of these hollow concretions contain a smaller concretion inside, which rattles when shaken in the hand.—*Drug. Circ.*, Aug., 1866.

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*Honey and Bees in California*.—Many citizens have engaged extensively in keeping bees, and it is found that they multiply and thrive in the most satisfactory manner. A good hive will produce two hundred pounds of honey, or may be made to produce twenty new swarms in a single season. Mr. Hamilton, of Stockton, reports that from thirty-five hives with which he began in February, 1860, he had five hundred hives and twenty thousand and seventy-five pounds of honey on the first of October of the same year. The bee is dormant in California only two or three months, and they find abundant food even in the driest time.—*Drug. Circ.*, Aug., 1866.



*Nitroleum, the New Substitute for Gunpowder.*—A highly interesting official report has just been made by Colonel Shaffner of a series of experiments conducted by him at Washington, for demonstrating the use of nitroleum (which it should be explained is the new and far preferable name by which the Colonel designates the compound which has hitherto been called nitro-glycerine) in the explosion of mines. The results fully confirm the fact that the explosive qualities of nitroleum are far in advance of gunpowder. Two similar cast-iron pieces, weighing each 300 lbs., had a hole one inch diameter and fifteen inches deep bored in them, and were charged one with powder and the other with "nitroleum." The powder discharged through the fuse-vent three-sixteenths inch diameter did no injury. The nitroleum tore the iron to pieces, the force extending downward from the bottom of the charge, leaving a cone with its apex at the bottom of the drill-hole. Four musket-barrels were placed in wrought iron cylinders, two filled with gunpowder and two filled one-third full with nitroleum. The musket barrels charged with powder were exploded by electricity; they burst open, tearing the iron to pieces. The explosion of the barrels charged with nitroleum produced a very different effect; they were flattened, and not so much broken to pieces; the force was so sudden and great that after the barrel had irregularly broken up and down the iron appeared like rolled plate—even and polished. The experiments appear to demonstrate that nitroleum can, with ordinary precautions, be handled and employed without greater danger than is common to gunpowder, and for blasting operations, at least, it presents undoubted advantages.—*Chem. News, Aug. 17, 1866, from Amer. Artisan.*

*Refracting Powers of Saline Solutions.*—Physical processes may in certain cases be advantageously employed to determine the chemical constitution of bodies. Density, boiling point, dilatation by heat, and even the capillarity of liquids, have been suggested as giving useful results. One of the last numbers of Poggendorff's *Annalen* contains a memoir by M. E. Reichert, on the different refracting powers by fluids modified by their chemical composition. This memoir contains the results of experiments on solutions of common salt of different strengths. The proportions of salt shown by optical means and by ordinary analysis agree very closely. The first column of the following table the proportions obtained by analysis, and the second the results of the optical method:—

2.26	2.27
7.12	7.13
12.02	12.07
17.25	17.25
23.02	22.89

An equally satisfactory result was obtained with solutions of sugar: but with alcohol and acetic acid the differences in the refractive indices are only half as great, and the indications, consequently, are not so satisfactory.—*Chem. News, Sept. 28th, 1866, from Les Mondes.*

*The Hardness of Silver.*—Goldsmiths often complain of the hardness of silver, which is sometimes very difficult to carve, and presents a dead grey cut. These properties are generally attributed to the presence of a foreign metal: but M. Mathey, assayer at Locla, has shown that in this silver there is neither tin, lead, nor any other injurious metal. He considers this property to be due solely to the high temperature at which silver is cast. By letting the crucible cool till a slight solid crust is formed on the surface of the fused metal, and casting at this moment, a soft silver with a brilliant cut is obtained.—*Chem. News*, Sept. 1866, from *Dingler's Polytechn. Journal*.

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*Rhæadine*—Hesse, looking for morphia, has discovered a new alkaloid in the red poppy; it is also to be found, he says, in good opium. It is soluble in water, alcohol, and ether, crystallizing from the last in white prisms. Ammonia precipitates it in white crystalline flocculi, bichloride of mercury gives a white amorphous precipitate, chloride of gold a yellow precipitate. Strong acids decompose it in the cold, giving a purple solution. The author promises to publish his method of extracting *Rhæadine*.—*Chemical News*. Aug. 17, 1866.

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### Abstract of the Minutes of the Philadelphia College of Pharmacy.

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A stated semi-annual meeting of the Philadelphia College of Pharmacy was held at the College hall, on Monday evening, September 24th, 1866.

Nineteen members present.

In the absence of the President the 1st Vice President, Samuel F. Troth, presided.

The Minutes of the last meeting were read and adopted.

The Minutes of the Board of Trustees were read by the Secretary of the Board. By the minutes of the Board the College is informed that John M. Maisch was duly elected to the chair of Pharmacy in the school of the College, made vacant by the resignation of Prof. Procter.

The Minutes of the Board also inform that the charge for Lecture tickets has been increased from \$8 to \$10.

Henry Cramer having been recommended by the Board of Trustees for resident membership, an election was ordered,—Wm. J. Jenks, acting as teller reported Mr. Cramer duly elected.

The delegates to the meeting of the American Pharmaceutical Association, lately held at Detroit, reported, through Prof. Edward Parrish, their attention to that duty.

The semi-annual election for eight trustees being ordered, Wm. C. Bakes and Wm. Evans, Jr., acting as tellers, reported the election of the following members as

*Trustees,*

Dr. Wilson H. Pile,  
 Alfred B. Taylor,  
 Wm. C. Bakes,  
 Henry N. Rittenhouse,

Edward Parrish,  
 Evan T. Ellis,  
 Wm. J. Jenks,  
 Chas. Shivers.

*Committee on Deceased Members,*

Edward Parrish,      Wm. Procter, Jr.,      Charles Bullock.  
 On motion, then adjourned.

CHARLES BULLOCK, *Secretary.*

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## Editorial Department.

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### BRITISH PHARMACEUTICAL CONFERENCE AND EXHIBITION AT NOTTINGHAM.

—This body met on the 21st of August, as announced, and the meeting appears to have been very satisfactory to those who participated in its movements. The meeting convened in the Assembly Rooms, Nottingham, at 10 o'clock, A. M. After the election of seventy-seven new members, the Report of the Executive Committee was read, from which we learn that three members of the Conference died during the year; that the number of members of the Conference is nearly 400; that, in the opinion of the Committee, an excellent influence both local and general, is being exerted by the Conference; and that as a Body it may now be looked upon as fairly established. The exhibition accompanying the present meeting, is alluded to as tending to the advancement of Pharmacy, and worthy of continuance as an annual feature. The Treasurer's report was then read and disposed of, when the President, Prof. Bentley, delivered the annual address. The study of Botany in connection with Pharmacy was the theme chosen, without any reference to the policy of the Conference, or the transactions in the interim, as is usual in our Association. Very good arguments are adduced why pharmacutists should be acquainted with botany, and as a paper it reads well and contains many valuable hints. The reading of the regular papers then commenced, and seven were disposed of at the first sitting, several of which have been reprinted in this number.

The second sitting, which commenced at 10½ o'clock, A. M., on Wednesday, was occupied by Mr. Joseph Ince, of London, in reading an admirable paper on Pharmaceutical Ethics, which he discusses under the following heads:—"Ethics of the Shop," "Social Ethics,"—"The behaviour of the Pharmaceutist with regard to those in the same line of business with himself," "Medical Ethics,"—"The behaviour of the Pharmaceutist with regard to the Medical Profession," "Ethics of Public Life—the behaviour of the Pharmaceutist as a member of his Society," "Personal Ethics—the behaviour of a Pharmaceutist as an individual," and "Ethics

of trade extension," the whole occupying more than thirty pages of this Journal, and too bulky for transfer. The writer is held in good esteem among his fellow members, and is a frequent contributor to the *Pharmaceutical Journal*; his style is peculiar, forcible, often quaint. He is evidently a man who reads much and thinks as he reads. At the risk of displacing other matter, we offer our readers the first section—*the Ethics of the Shop* :—

"Pharmacy is a trade. When a man buys goods at one price to sell them at another, gaining the advantage of the difference in tariff, being further influenced by the known law of supply and demand, he is engaged in trade. When he buys in undivided bulk, to sell again in undivided bulk, he is a merchant, but still engaged in trade. When he purchases in undivided bulk to vend in large though in divided bulk, he is a wholesale tradesman. When he buys articles in a divided bulk, to sell again in small divided bulk, he is a retail tradesman; nor does it make the slightest difference whether he sells hats or Turkey rhubarb, nor whether the seller of the rhubarb be Sir Humphry Davy.

The artist, on the other hand, is a professional man. One painter buys so many feet of canvas, together with so much paint; he places, possibly, upon that canvas something which may not increase its value. A second buys the same amount of canvas, inch by inch, on which he puts the same amount of color, ounce for ounce, and the result may be "The Immaculate Conception."

He places on the canvas that which he cannot buy—God gave it him, and without any phrase of poetry he exercises the gift divine. Neither is the true artist influenced by the necessities of competition, nor by the trade fluctuation arising from supply and demand.

A hundred artists more or less would not alter his position; a hundred paintings on the same subject would not detract from the merit of his own. Its value is intrinsic, and not relative. But the pharmacist buys his stock, whether of drugs, chemicals, or sundries, in order to sell again—he is a tradesman.

But other influences are at work to modify the general fact—the awakening claims of universal education, the long unflinching teaching of our own Society, the actual pressure from without. Then there is the influence of locality: the West End customer *will* have more than shop dexterity, and in my own neighborhood the mere tradesman would find himself gazetted.

There is the influence of individual character. The master, fortunately for himself and those around him, has higher than trade instincts, from which circumstance his trade assumes more or less a strictly professional character; but it no more ceases to be a trade than the orchid which counterfeits so strangely shapes of natural beauty ceases to be a plant.

Never forgetting the essentially trade nature which belongs to pharmacy, we at once come to the first ethical rule of the pharmacist, namely, the necessity for the absolutely genuine character of his drugs. No drug or remedy should be admitted into his shop other than that which, in case of dangerous illness, he would not hesitate to supply to the inmates of his own family circle. He cannot be expected to keep the whole range of *Materia Medica*, nor is he to be blamed for applying for eclectic remedies elsewhere. This is an affair of means and circumstances; but in no case should any trade casuistry induce him to lower the standard of excellence of whatever he may possess.

The pharmacist who bears this rigidly in mind will be in no danger of degrading himself by the adoption of low and ruinous prices. Whoever has committed this transparent trade mistake must not afterwards blame the public for exacting the continuance of a state of things to which he has himself voluntarily stooped. On this topic I have great pleasure in giving you the opinion of your excellent treasurer, Mr. Brady:—"The principle which ought to guide the pharmacist in the regulation of his charges is that remunera-

tion should increase in proportion as the class of article makes greater demand on the knowledge obtained by his professional education. If he sells articles dealt in by other classes of tradesmen, he must submit to the same rate of profit. In drugs proper, which require an educated judgment, power of testing and the like, he is entitled to a much higher rate; whilst in all matters of dispensing, his charges should be professional in their character, and not calculated on the cost of employed materials at all. We cannot materially increase the quantity of medicines sold by reducing the price; hence any of us endeavoring by low charges to increase his business must recollect that he does it to the direct injury of the body, in reducing by so much the amount of money that might accrue from its legitimate practice. In large towns the responsibility of prices charged rests with one or two leading men, and if they are true to their professional instincts, the calling can scarcely fail to prosper."

I agree with the above, and I may add that the pharmacist saves himself an immensity of trouble, and will most probably prolong his days, if he will once have the courage to adopt one uniform fixed price, else he is subjected to continual petty annoyance. Having determined to be the master of his own business, he will be content to abide by his own regulations, and not, on the one hand, place himself at the mercy of the competing pharmacist who trims his sail to every wind that blows, or, on the other, to the caprice of the customer, who not always truthfully asserts that he has obtained articles of definite commercial value at a starvation price.

Not only his regard to self-respect, but to his trade interest, will be his guide to a third ethical observance, viz., to supply the public with the precise articles for which they ask. This point strikes me not so much as a question in ethics as in a purely business light; but I have been requested to bring it forward, and I am bound to do so.

The rule of every well-regulated establishment is to supply faithfully and implicitly whatever in the whole range of pharmacy a customer may require—to obtain it if not in stock, whether English or foreign, and to spare no pains that it shall be the identical thing desired.

To do otherwise seems to me not to warrant so fine a phrase as a trade error, but a pure shop mistake. Does the customer want liquor bismuthi, Schacht, he is supplied from Clifton; does he send for Brown's chlorodyne, he receives that made by Mr. Davenport; if quinine be ordered, salicine must not be substituted; and so with the list of similar preparations, whether demanded as a retail order, or as forming an ingredient in a physician's recipe. This course of action is due, not to any particular keen sense of honor, but to trade expediency, precisely as a wise fisherman spreads a well-made net in order that the fish should not slip through. Any house in town or country adopting such a principle must and does gain a reputation which infinitely counterbalances the small extra remuneration to be made out of fictitious articles. Confidence brings trade, and trade puts money in the till—a more practical result than might have been anticipated from the study of pharmaceutical ethics.

This subject may have been proposed in consequence of some of its details not having been clearly grasped. On the one hand, there is a great waste of misapplied ingenuity in the constant attempt to produce colorable imitations of preparations, secret or otherwise, which have gained reputation for some particular chemist. Against this there is no human law; but the moral law, which is the law of God, says such practices are fraudulent, and beneath the dignity of every upright man, and they betray a paucity of inventive power, and it is, moreover, certain that the same skill might find more creditable as well as more remunerative employment.

Still, some pharmacutists are in bondage to a groundless fear; they hesitate, under a strained sense of honor, to enter upon what they think pre-occupied, and therefore forbidden ground. "Why," writes Mr. Giles, "should there be any speciality in pharmaceutical production? The same laws will protect an invention in pharmacy as in mechanics, and when the law professes

to deal with the matter, it is a question whether any other protection is needed. You may say ethics shall do what the law does not, and so it should in cases too refined for the law to deal with; but here the law does operate."

From the foregoing it is clear that while no one is justified in the fraudulent imitation of a patent right, either in or out of the pale of pharmacy, yet no pharmacist can claim the exclusive manufacture of any special article in perpetuity, simply because a particular mode of working originally suggested itself to his mind. There is no law in trade or ethics to prevent a man making liquor opii to the best of his ability, any more than in the case of morphia and meconic acid. The most scrupulous and conscientious chemist may get quinine and cinchonine from bark. What casuistry shall assign an arbitrary limit forbidding him to make a liquor? The whole world may make magnesia, light and heavy, calcined or carbonate, although Battley and Howard and Henry have been beforehand in the field. Let not the pharmacist shrink from the lawful use of the experience and labors of the past; which is no reason why he should shrink into a mere copyist, and should not, like Columbus, sail out of the beaten track in search of land not hitherto discovered.

There is a major ethical consideration that can only be treated in a minor key—perfect civility to, and careful attention to the smallest wants of the poorest customer—a civility that should be expressed by words and manner. The ethics of civility to rich customers need scarcely be discussed; in that case, for ethics, read advantage.

Our American brethren have taken the lead in drawing up a regular Code of Ethics. You will find the document in the "Pharmaceutical Journal," Vol. xii. p. 369.

They have also, I think, been most successful in giving directions about the last topic I have to mention in connection with shop ethics—the mutual relation between the master and the assistant.

For general rules I refer you to a paper republished in our Journal, called the "Pharmacist as a Merchant," (vol. vi. p. 655, second series). The idea is admirable, and the literary execution quite equal to the design.

Mr. Frederick Stearns, the author, seems to have steered most successfully between the Scylla of the high and dry, and the Charybdis of the goody-good.

I refer you also to some excellent rules published at the end of Parrish's, "Practical Pharmacy;" it contains one difficult proposition, p. 676:—

"Second General Regulation of the Store. During business hours all hands must be on their feet."

Rule XIII. is beyond our present standard. "Every apprentice will be expected to become a graduate of the College of Pharmacy, and will be furnished with tickets of the College, and every opportunity for availing himself of the honor of the degree of that institution." I do not feel called upon to dilate upon this question. There is such a wide difference in individual character, that special rules seem to be impossible. After all, we shall scarcely get further than the inspired direction, "He that ruleth with diligence."\* One point I am compelled to notice, that ethics concern the assistant quite as much as they do the master. I have no intention of adding to the already hard position of the former by harsh remarks, but I say deliberately that neither our current literature, nor the general tone of sentiment expressed in private, bears sufficient trace of the recognition that a code of ethics extends beyond the master. Let the assistant feel that he has a part to play, just

\* It is constantly overlooked that both master and man are overruled by an exacting public, and the public by an equally exacting master—the habits and customs of society.

Young men, while resisting the orders and regulations of their employers, are apt to overlook the circumstance, that the regulations have been deliberately and carefully framed to meet the exigencies of business long before they sold their labor for a salary; hence the antagonism between master and man, and the shipwreck of sound morality.

Young men complain of the little time the business affords for reading: "where there is a will there is a way;" let them employ that little time in reading wholesome standard works of religion, morality, and science, and the standard of ethics would soon be raised above petty considerations arising out of the details of business.—*Note contributed by Mr. Deane.*

as difficult and just as important as his employer ; that on his side he must exercise consideration, and adopt the high tone of feeling which characterizes the English gentleman, and he will do more to render pharmacy endurable, and to promote its social welfare, than whole reams of essays written on the subject. It is painful to recollect that those identical assistants who complain the most bitterly about long hours, close confinement and other ills incident to pharmacy, are sometimes, when once in business on their own account, the very men to perpetuate and extend the evil, and practically, to rivet another link to that chain with which we are darkly bound. Solely for this reason, I have no faith in the efforts that have been made occasionally with regard to early closing. The ethics have been invariably on one side. Once the king of animals was asked his opinion on a work of art. The painting represented a man smiling and self-confident, who, with the most perfect equanimity, was slaying the noble beast.

"Wait till I paint," said the lion.

As matters stand, masters are to shut up, and assistants to improve their minds. I have never seen my way out of this question (nor has any one else); yet I believe that in an establishment where there are two or more assistants, if they would calmly set to work to see how far earlier hours could be adopted without injuring existing business; if, in so doing, they on their part would carefully weigh the master's interest, and be as ethical towards him as they wish him to be towards them; and if, instead of calling him hard names and making excited speeches at a London tavern, they would bear in mind that he is quite as much interested as they; I guarantee that he would be found a willing listener, and there would then be the first and only fair chance of which I know, of both being set at liberty at more rational hours than they are at present.

Before leaving the shop altogether, may I press upon your consideration the desirability of calling it "a pharmacy." The word is English, not fanciful; it is used in the same sense throughout France and Belgium, is highly expressive, and is on all grounds to be recommended."

The remainder of the sitting was occupied with an interesting discussion of topics, embraced in the paper of Mr. Ince.

The third sitting commenced on Thursday, Aug. 23d, and was occupied in reading ten papers on scientific and practical subjects, one of which, on Plasma, is copied into this Journal. Reference was made to a communication from Prof. Parrish, of Philadelphia, to Mr. Dymond, of Birmingham, accompanying certain specimens sent to the exhibition from Pharmacutists in the United States, in which he expresses the hope that the Conference would appoint a delegate to our next Annual Meeting. The President remarked that the Conference was under great obligations to Prof. Parrish, but believed the appointment of a delegate to go so far was attended with difficulties nearly insurmountable, and the matter was left with the Executive Committee to manage, if a way opened.

The fourth and concluding sitting did not occur until Wednesday the 29th; Mr. T. B. Groves in the chair. On this occasion it was resolved that the next Annual Meeting, be held at Dundee, in Scotland. The reception of the Proceedings of the American Pharmaceutical Association, from Prof. Maisch, was acknowledged, and the election of officers for 1866-67, carried out, by which Prof. Bentley, was re-elected President, Messrs. Deane, Hanbury, Stoddart and Ince, as Vice-Presidents, and Dr. Attfield and Mr. Reynolds, Secretaries.

Friday, the 24th, the members visiting Nottingham were invited to a dinner, given in honor of the occasion, by the Nottingham Local Committee, which seems to have been partaken of to satisfaction.

We have not space to give even a condensed sketch of the articles on exhibition, a mere list of which, with short notes, occupies 22 pages of the *Pharmaceutical Journal*. The few articles sent from the United States were received with marked approval, more, however, for the interest exhibited in recognizing the Conference as a body, by sending them so far, than for the extent, variety or rarity of the articles exhibited. We observe the names of Prof. Parrish, Mr. Stearns, of Detroit, Suire & Co., of Cincinnati, William R. Warner & Co., and Mr. Wm. C. Bakes of Philadelphia, as depositors. The report says:—"The Committee desire, with both hands, to shake hands with their esteemed American brethren. They fully appreciate the good feeling evinced towards them, by the collection forwarded across the Atlantic to this the first exhibition of the British Pharmaceutical Conference, nor could it have come under better sanction than the name so well known in practical Pharmacy, as that of Prof. E. Parrish, of Philadelphia." In the line of *Materia Medica* and Chemicals, some very valuable deposits were made, which must have added much to the interest of the exhibition in that direction. We hope to be able to allude to this subject again, and notice some of the items of special interest.

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ST. LOUIS COLLEGE OF PHARMACY.—The following letter to the Editor explains itself:—

ST. LOUIS, Oct., 11, 1866.

*Dear Sir:*—At the annual meeting of the St. Louis College of Pharmacy, held at their hall, Monday, Sep. 24th, 1866, the following gentlemen were elected:—Enno Sander, President; W. H.<sup>g</sup> Crawford, 1st Vice President; E. L. Massot, 2d Vice President; H. Prim, Recording Secretary; E. J. Williamson, Corresponding Secretary; Dr. C. L. Lipps, Treasurer. The College opened its session, with about the same class as last year, on the first of October.

Very respectfully,

E. J. WILLIAMSON,  
*Cor. Sec.*

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INTERNATIONAL MEDICAL CONGRESS.—The following item, which we take from the "*Medical News*" for August, informs that the medical men of Europe are about getting up an International Medical Congress next year. The pharmacutists have already arranged such a gathering of their body:

The preliminary steps have been taken for the assembling in Paris, at the time of the Universal Exhibition, in 1867, of an International Medical Congress. With this view a central committee has been formed at Paris, who have elected the following officers: *President*, M. Bouillaud; *Vice-*



*Presidents*, MM. Denonvilliers, Gavaret, and Tardieu; *Secretary*, M. Jacoud; *Treasurer*, M. E. Vidal.

This scheme has been sanctioned by the French government, and the Paris committee are preparing the rules and programme of the Congress, which they promise to communicate as soon as determined on. In the meantime we cheerfully comply with the request made to us, to make known the project, and ask the co-operation of the profession in this country.

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OUR EXCHANGES.—Our Southern exchanges are slowly coming back again. The Atlanta Medical and Surgical Journal, the Nashville Medical Journal, the Savannah Journal of Medicine, and the New Orleans Medical Record, have been received, and the Richmond Medical Journal comes regularly,

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*Elements of Medical Chemistry.* By B. Howard Rand, M.D., Professor of Chemistry in Jefferson Medical College, Philadelphia. T. Ellwood Zell & Co., 1867: pp. 399, 12mo.

This work has been arranged by the author as a text book for medical students, and he regards it as equivalent to a full set of notes to his course on chemistry in Jefferson Medical College. Aware of the "immense extent of the subjects comprised under the general head of chemistry and physics," he has, by a careful selection, made the effort to embrace so much of the topics in this small volume as shall be most useful to the student in grasping the subject within the limited time he has to devote to it among his numerous studies, expecting the more extended writers to be resorted to when time and opportunity favor it. The term "medical" chemistry is used to convey the idea that in his selections and explanations the author has had in view the uses which the physician makes of chemistry, and has dwelt more pointedly on such portions as bear on his specialities.

The author very properly urges a rigid adherence to the processes of the U. S. Pharmacopœia, and in using officinal titles for preparations, gives those of the Pharmacopœia when included in that work. The universal use of symbols to designate chemical composition, and the necessity of understanding them in order to comprehend the text books and journals, has induced Dr. Rand to give special attention to the elucidation of symbols and nomenclature. The preparation and use of antidotes, and tests for poisons, has received due attention.

The publisher has done his part well, the type being clear and the paper good. Price, \$6.00.

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*Practical Therapeutics*, considered chiefly with reference to articles of the *Materia Medica*. By Edward John Waring, F. R. C. S., F. L. S., Surgeon. From the 2d London edition. Philada.: Lindsay & Blakiston, 1866; pp. 815, octavo.

This handsome volume was received just as we were going to press; notice in our next issue.

## OBITUARY.

HENRY DARWIN ROGERS, one of the most eminent of American geologists, died on the 29th day of May, 1866, at Glasgow, in Scotland. Prof. Rogers was born in Philadelphia in 1809, and at the age of 21 years was elected Professor of Chemistry at Dickinson College, Carlisle, Pa., and afterwards to the Chair of Geology in the Collegiate Department of the University of Pennsylvania. He concluded the geological exploration of New Jersey in 1835, and in 1836 commenced his greatest work,—the exploration of the State of Pennsylvania,—which, after many years of diligent labor, was brought to a close; but the finished report did not appear until 1858, owing partly to want of appropriations for publishing the work, and partly to the great care bestowed on its illustrations, which were completed and published at Edinburgh. In 1857 Prof. Rogers was elected to the Chair of Regius Professor of Geology and Natural History in the University of Glasgow,—an honor rarely, if ever before, bestowed on an American savant.

“His great knowledge on many subjects he was able to impart in a style equally clear and graceful, whether in public speaking or as a writer. Few teachers of science have excelled him in the power of illustrating difficult subjects, or in commanding the attention of large audiences to themes not commonly discussed in public lectures.” He possessed remarkable powers as a conversationalist, which caused him to enjoy a high social position, both in Europe and America, with a numerous body of friends.

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M. DESCHAMPS, well known as an eminent pharmacist, died at Avallon on the 14th day of June, at the age of 62 years. He was a frequent contributor to the pharmaceutical journals, and the author of the process for preserving ointments and cerates by benzoin and poplar buds, now so generally used and approved.

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Prof. JOHN A. PORTER.—John Addison Porter died at New Haven, Conn., on the 25th of August. Prof. Porter was born in Catskill, N. Y., March 15th, 1823, and graduated at Yale College in 1842. Possessed of literary as well as scientific tastes, he was called to fill the post first of tutor, and then of Professor of Rhetoric, in Delaware College, in Newark, N. J., where he resided from 1844 to 1847, when he went to Germany and studied chemistry under Prof. Liebig. Returning in 1850, he first filled the Professorship of Chemistry applied to the Arts in Brown University for two years, when he was called to take the place of Prof. John P. Norton, then recently deceased, as Professor of Analytical and Agricultural Chemistry in Yale College. In 1856 he was transferred to the chair of Organic Chemistry, which position he held until he felt constrained by his declining health to resign it, in 1864.—*Amer. Jour. Science and Arts*, Sept., 1866.

# INDEX

TO VOL. XXXVIII. (VOL. XIV. THIRD SERIES) OF THE AMERICAN  
JOURNAL OF PHARMACY.

Absorption and dialytic separation of gases by colloid septa.....	510
Academy of Natural Sciences.....	191
Acclimatization of the ostrich.....	182
Acetylin, its formation during incomplete combustion.....	263
Acid, arsenic, manufacture of.....	62
Acid, formic, some properties of.....	331
Acid, hydrofluoric.....	446
Acid, phenic or carbolic, manufacture of.....	18
Acid, pyrogallie, preparation of.....	20
Acid, toxicolendric.....	9
Aconite.....	513
Aconitia.....	515
Action of magnesium on metallic solutions.....	455
Active principle of rhus toxicodendron.....	4
Active principles of plants, effects of soil on the.....	45
Active principle of senna.....	374
Active principles of helleborus.....	245
Adulteration of linen by cotton detected by anilin.....	86
Adulteration of saffron with crocus stamens.....	225
Adulteration of resin of jalap with aloes.....	375
Advice upon epidemic cholera.....	310
Agates.....	566
Alcohol, economy of, in percolation.....	109
Alkaloids in aconitum lycotonum, two new.....	376
Alkaloids, their deportment with tests.....	447
Alkaloid in arnica.....	472
Alloys of manganese.....	377
Alumina in soap.....	85
Alumni Association of the Philadelphia College of Pharmacy.....	186
Alumni Association of the Philadelphia College of Pharmacy, annual re- port of.....	286
Amber, sophistication of rectified oil of.....	146
Amber, oil of, for hæmorrhoids.....	217
American dittany.....	495

American Pharmaceutical Association, notice of.....	378
American Sanitary Museum at Paris.....	382
American culture of opium.....	473
Ammonia, commercial carbonate of.....	133
Ammonium, sulphocyanide of.....	270
Anæsthetic, new.....	171
Andouard, M., on the purgative convolvulaceæ.....	206
Anilin a test for the adulteration of linen by cotton.....	86
Anilin colors.....	542
Anilin, oils used in making.....	542
Annual commencement of the Phila. College of Pharmacy.....	274
Anti-actinic paper.....	474
Antidote for prussic acid, antimony and arsenic.....	12
Antidote for cyanide of potassium.....	15
Antidote for tartar emetic.....	15
Antiseptic qualities of quinia.....	45
Antiseptics.....	431
Appearances of good and bad meat.....	265
Application of magnesium to toxicological researches.....	455
Application of disinfectants in arresting the spread of cattle plague.....	356—427
Armenian or diamond cement.....	57
Arnica, alkaloid in.....	472
Arrow root, assay of its purity.....	377
Arsenic, antidote for.....	12
Arsenic acid, manufacture of.....	62
Artificial mineral waters.....	281
Asagrea officinalis.....	499
Asclepias contrayerva.....	501
Aspartic acid in beet-root molasses.....	506
Aubergier's syrup of lactucarium.....	293
Automatic vacuum apparatus.....	129
<i>Babcock, James F.</i> , on the preparation of sulphocyanide of potassium.....	306
Barbudilla.....	501
Bark of sassafras root.....	489
Barks of Bolivia.....	419
Barks of Loja or crown barks.....	423
<i>Barr, John</i> , on extract of cod-livers.....	142
<i>Bartlett, N. Gray</i> , on an automatic vacuum apparatus.....	129
Battley's sedative solution of opium.....	304
<i>Bechamp, M. A.</i> , on the physiological exhaustion and vitality of beer.....	161
Bee bread as a diuretic.....	56
Beer yeast, physiological exhaustion of.....	161
Bees in California.....	566
Bees, why do they work in the dark.....	239
<i>Bell, J. Carter, F. C. S.</i> , on the manufacture of commercial carbonate of ammonia.....	133
<i>Bentley, Prof. Robert</i> , on the adulteration of saffron with the stamens of crocus.....	225

<i>Berthelot, M.</i> , on the formation of acetylin in incomplete combustions.....	263
<i>Bigelow, Dr. H. J.</i> , on rhigolene for producing local anæsthesia by cold...	363
Bismuth .....	87
Bismuthi, Liquor.....	1
<i>Blum, M.</i> , on cantharidin.....	247
<i>Blair, Henry C.</i> , on cyripedium pubescens.....	494
Borax in California.....	235
Borden's extract of beef.....	81
<i>Boussingault, M.</i> , on the formation of glucose in leaves.....	161
“ researches on the action of foliage.....	461
Borax, virtues of as a detergent.....	565
Botany Bay, or grass tree gum.....	465
<i>Brady, Henry B.</i> , on extracts of meat.....	76
<i>Brewer, Prof. W. A.</i> , on the tenacity of life of the seeds and spores of some plants.....	318
Brandy, pharmacopœia strength of.....	325
Brahee sugar .....	383
<i>Bringhurst, Ferris</i> , on yellow wax as a constituent of cerates compared with white wax.....	337
British Pharmaceutical Conference.....	480
British Pharmaceutical Conference and Exhibition at Nottingham.....	569
Brucia, reactions of.....	549
Cadmate of potassa.....	504
Caffetannic acid.....	504
Calcutta botanical gardens.....	166
Camphor water.....	165
Cantharidin.....	247
Carbolic acid, preparation of.....	18
Carbonate of ammonia, manufacture of.....	133
Carminic acid .....	504
Castilloa elastica, or <i>ule</i> .....	503
Catalogue of the class of the Philadelphia College of Pharmacy for the 45th session, 1865-66.....	95
Cavendish society.....	189, 291
Cebadilla .....	498
Cebolleja.....	498
Cerates, preservation of.....	151
Cevadilla.....	498
Cheap manufacture of phosphate of soda as manure.....	184
Chemical researches on the myrtle of Australia.....	212
Chemical history of sassafras.....	489
Chia ( <i>salvia hispanica</i> ).....	502
Chlorate of quinia.....	474
Chloroform for removing paint.....	182
Chloroform, preservation of.....	473
Cholera, advice upon epidemic.....	310
Cholestearin in carrots.....	505

Cinchona culture in Ceylon.....	352
Cinchona, tests for.....	452
Citric acid, manufacture of.....	169
Citrate of magnesia, soluble.....	300
Cleansing of tarnished silver.....	475
<i>Clowes, Frank</i> , on sulphocyanide of ammonium .....	270
<i>Close, George C.</i> , on a remedy for epilepsy.....	323
Cod-livers, extract of. ....	139
Colchicum seed, fluid extract of.....	112
Colchicin.....	105
Collodion, formula for.....	563
Copal resin.....	255
Copal, origin of Angola.....	439
Copalm, a sweet gum tree.....	33
Cotton-seed oil.....	30
Crithmic acid.....	301
Crithmum maritimum.....	301
Crop of peppermint in Michigan.....	68
<i>Crookes, William, Esq.</i> , on the application of disinfectants to prevent the spread of the cattle plague.....	356
Cubebæ, oleoresin of .....	210
Culture of cinchona in Ceylon.....	352
Culture of cinchona in Darjeeling, India.....	354
Culture of opium in Arizona, proposed.....	473
Cultivation of vanilla in Mexico.....	38
Cunila mariana.....	495
Cyanide of potassium, antidote for.....	15
Cypripedium pubescens.....	494
Dandelion root.....	473
<i>Dannecy, M.</i> , on ozone as decomposing iodide of potassium ointment..	298
Dentifrices.....	537
Depotment of the most important alkaloids with reagents.....	447, 546
Detection of cotton-seed in other oils.....	30
Detection of methylic alcohol in alcoholic and ethereal fluids.....	58
<i>Derville, H. St. Claire</i> , on the hydraulicity of magnesia.....	182
<i>Dexter, William P.</i> , on the preparation of hydrofluoric acid.....	446
Diamond cement.....	57
Diffusion of fluids by the atomizer for deodorization and disinfection.....	55
Discovery of a mammoth .....	563
Dispensing of ointments.....	151
Disinfectants generally.....	360
Drying of glutinous substances.....	74
<i>Dupouilly, Brothers</i> , on the manufacture and properties of anilin colors, and the bodies used in their preparation.....	542
<i>Ebert, Albert E.</i> , remarks on liquor bismuthi.....	1
“ “ on the sophistication of oil of amber.....	146

Economy in alcohol in making fluid extracts.....	223
Editorial department.....	88, 186, 278, 379, 475, 569
Effects of soil on the active principles of plants.....	45
Effects of the bite of a centipede .....	561
Eggs, how to keep.....	88
Electricity of wood.....	344
Electrical machine, new.....	344
Elixir of valerianate of ammonia.....	150
Employment of gelatin for capsuling bottles.....	248
Employment of nitroglycerin in quarries .....	523
Erythrocentaurin.....	303
Essay on sassafras officinale.....	481
Essence of cognac and of wine.....	168
Estimation of morphia in opium.....	512
Euphorbia chilensis.....	104
Extract of beef, Borden's.....	81
Extract of bitter almonds.....	295
Extract of black pepper.....	297
Extract of celery.....	297
Extract of cinnamon.....	296
Extract of cod livers.....	139
Extract of coriander.....	298
Extract of capsicum .....	297
Extract of ginger.....	296
Extract of hemlock bark.....	214
Extract of lemon.....	294
Extract of nutmeg.....	296
Extract of orange .....	295
Extract of roses.....	296
Extract of soup herbs .....	297
Extract of vanilla.....	298
Extracts of meat.. .....	76
Extractum carnis.....	89
Extractum Cinchonæ Fluidum.....	411
Explosion of nitroglycerin.....	316
Flavoring extracts.....	294
<i>Farre, J. Frederick, M. D., Cantab</i> , on the growth and preparation of rhubarb in China.....	153
Fatty vegetable oils, oxidation of.....	86
Finger jalap, large and small .....	208
Fixed oils, new facts relating to.....	299
Flower farms of France .....	63
Fluid extract of colchicum seed.....	112
Fluid extract of cinchona.....	325
Fluid extract of rhubarb with glycerin.. ..	326
Fluid extracts, Dr. Squibb's process for.....	109
Fluid extracts, N. Spencer Thomas' process for.....	218

Formation of glucose by leaves. ....	160
Formation of nitrite of potassa.....	474
Formation of acetylin by incomplete combustion.....	263
Formic acid, on some properties of.....	331
Formula for collodion.....	563
<i>Francis, Dr. C. E.</i> , on dentifrices. ....	537
<i>Frezenius, Prof. C. R.</i> , on the deportment of the most important medicinal alkaloids with reagents.....	546
Gelatin bottle capsules.....	249
Gleanings from the French journals.....	298, 548
Glucose, manufacture of.....	19
Glucose, its formation by leaves.....	160
Glycerin to prevent the deposition of apotheme.....	325
Glycemates.....	559
Glycemyl .....	559
<i>Gobley, M.</i> , on orange leaf water as an adulteration of orange flower water..	301
Gomme de nopal.....	503
Gomme de Sonora.....	503
Graduates of the Philadelphia College of Pharmacy for 1866.....	275
<i>Graham, Thomas, F. R. S.</i> , on the absorption and separation of gases by colloid septa.....	510
Grass-tree gum.....	465
Great prize in electricity.....	563
<i>Groves, Thomas, B.</i> , on aconite.....	513
Growth of rhubarb in China .....	153
<i>Guibourt, M.</i> , observations on some productions of Mexico.....	497
Gum copal in Angola.....	439
Gum, grass-tree.....	465
Gum of Maguey.....	503
<i>Hanbury, Daniel</i> , on pharmaceutical herbaria.....	334
Hard rubber, Dentists'.....	185
Hardness of silver.....	563
<i>Haselden, A. F.</i> , on the employment of gelatin instead of metallic cap- sules for bottles.....	248
Helleborus, active principles of.....	245
Helenium autumnale.....	502
Hemlock bark, ( <i>Abies canadensis</i> ), extract of.....	214
<i>Herouard, M.</i> , researches on the volatile and fixed oils of samphire.....	301
Hereoue.....	561
Hints to dispensers.....	347
Honey in California.....	566
<i>Howard, John Eliot, F. L. S.</i> , observations on the present state of our knowledge of the genus cinchona.....	417
Hydraulicity of magnesia.....	182
Hydrofluoric acid, preparation of.....	446
Hyduret of crithmyle.....	301
Hyoseyamus, active principle of.....	527



Indigo dying, new process of.....	269
Insects injurious to vegetation.....	90
Internal revenue laws in relation to pharmacy.....	92
International Pharmaceutical Congress at Brunswick.....	278
International Pharmaceutical Congress of Paris, 1867.....	381
International Medical Congress.....	574
Introduction of shad in southern rivers.....	565
Iodide of potassium, preparation of.....	267
Iodine, new test for in liquids.....	300
Iodine, detection of.....	444
Iron valerianate of.....	532
<i>Jackson, John R.</i> , on pepper.....	23
“ “ on orchid tea.....	441
Jalap.....	206
Jalap, finger.....	208
<i>Jerningham, F. E. S.</i> , on a new electrical machine, &c.....	343, 344
<i>Jodin, M. F. V.</i> , on some properties of formic acid.....	331
Journal of applied chemistry.....	192
<i>Kopp, M. E.</i> , on the employment of nitroglycerin in quarries.....	523
Lactucarium, Aubergier's syrup of.....	293
Lavoisier, works of.....	180
<i>Lea, M. Carey</i> , on the detection of iodine.....	444
Lead poisoning, wholesale.....	366
Leaves, formation of glucose by.....	160
Lemons, preservation of.....	474
<i>Leuchs, M. J. C.</i> , on a new process for indigo dying.....	269
<i>Liebig, Justus</i> , on the nutritive value of extractum carnis.....	82
Lignum sassafras.....	457
Linn, or sweet gum tree.....	33
Linoleum manufacture.....	372
Liquid glue.....	564
Liquidambar styraciflua and its balsam.....	33
Liquor bismuthi.....	1
Liquor opii sedativus.....	304
List of graduates for 1866.....	275
Local anæsthesia from cold.....	259
Louisiana rock salt.....	328
<i>Luca, Prof. De</i> , on mannite from the olive tree.....	179
<i>Luca, Prof. De and M. Ubaldini</i> , on the myrtle of Australia.....	212
<i>Ludwig and Hubler</i> , on colchicin.....	105
<i>Luyne and Espandieu, M.M.</i> , on the preparation of pyrogallie acid.....	33
Magic photography.....	371
Magnesia, hydraulicity of.....	182
Magnesium light.....	181
Magnesium, facts relating to.....	455
Magnesium, its action on metallic solutions.....	44

Magnesium, its use in toxicology.....	458
<i>Maisch, John M.</i> , on the active principle of <i>Rhus toxicodendron</i> .....	4
Mannite from the olive tree.....	179
Manufacture of glucose.....	19
Manufacture of arsenic acid.....	62
Manufacture of phosphate of soda cheaply.....	184
Manufacture of cod-liver oil in Norway.....	215
Manufacture of citric acid by citrate of magnesia.....	252
Manufacture and properties of aniline colors, and the oils used in preparing them.....	542
Manganese, alloys of .....	377
Marine glue.....	564
<i>Markham, Clement</i> , on the culture of cinchona in Ceylon.....	352
<i>Markoe, G. F. H.</i> , on camphor water.....	166
<i>Maubre, M.</i> , on the manufacture of glucose.....	19
Meat, to distinguish good from bad.....	265
Mechoacan—male jalap.....	501
Medical purveying in the U. S. Army during the war.....	271
Meeting of the American Pharmaceutical Association.....	379, 475
Mellon, a residue from "Pharaoh's Serpents".....	61
<i>Melsens, M.</i> , on the mutual action of soluble salts without and within the animal economy.....	521
Methylic alcohol, its detection in other fluids.....	58
Methyl strychnia, physiological effects of nitrate of.....	504
Method of drying glutinous substances.....	74
Method of hastening filtrations.....	177
Metrical system of weights and measures .....	380
Metropolitan Board of Health on the cholera.....	313
Mexico, on some productions of.....	497
Mexican gum arabic (gum mezquitl). .....	503
<i>Milleman, Philip</i> , on <i>cunila mariana</i> .....	495
Minutes of the fourteenth annual meeting of the American Pharmaceutical Association.....	385
Minutes of the Philadelphia College of Pharmacy.....	276, 520
Mining Statistics of Great Britain.....	378
<i>Moorman, J. W.</i> , on poisoning by eating the fruit of <i>Rhus toxicodendron</i> , .....	322
<i>Moore, Prof. J. Paris</i> , on elixir of valerianate of ammonia.....	150
Morphia, tests for.....	448
Morphia, its estimation in opium.....	512
Mountain of saltpetre.....	87
<i>Muller, M.</i> , on the preparation of carbolic acid.....	18
Mutual action of soluble salts, &c.....	521
Myrtle of Australia.....	212
Narceia.....	454, 472
Narcotina, tests for.....	450
Native wine from rhubarb stalks.....	69
New instrument for rapid filtration.....	107

New anæsthetic.....	171
New process for making soda.....	172
New process for coating metals with other metals.....	173
New Professorships in the University of Pennsylvania.....	186
New fluid for natural history specimens.....	232
New process for indigo dyeing.....	269
New facts relating to fixed oils.....	299
New electrical machine.....	343
New sulphide of carbon.....	415
<i>Newbold, Thomas M.</i> , on <i>sanguinaria canadensis</i> .....	496
Niauli of New Caledonia.....	504
<i>Nickles, M. J.</i> , new facts relating to fixed oils.....	299
Nitrite of potash, formation of.....	474
Nitroleum and nitro-glycerin.....	567
Nitro-glycerine.....	314
Nitro-glycerine, explosion of.....	316
Nitro-glycerine, non-explosive.....	318
Nitro-glycerine, its employment in quarries.....	523
Note on the purification of platinum.....	268
Note on sulphocyanide of ammonium.....	270
Note on the tenacity of life of the seeds of some plants.....	318
Notes on the sophistication of rectified oil of amber.....	146
Nottingham meeting of the British Pharmaceutical Conference.....	380
Nutritive value of extractum carnis.....	82
<i>Obituary, Dr. John T. Plummer</i> .....	93
“ Sir Wm. J. Hooker.....	192
“ Prof. Wm. Thos. Brande.....	384
“ Wm. Southall.....	384
“ Lewis Thompson.....	480
“ Prof. Henry D. Rogers.....	576
“ M. Deschamps.....	576
“ Prof. John A. Porter.....	576
Observations on the present state of cinchonology.....	417
Observations on the origin of copal in Angola.....	439
Officers of the American Pharmaceutical Association for 1866.....	391
Officers of the Philadelphia College of Pharmacy for 1866.....	278
Oil, cotton seed.....	30
Oil of peppermint in Michigan.....	68
Oil of amber, sophistication of.....	146
Oil of amber for hæmorrhoids.....	217
Oil, manufacture of cod-liver, in Norway.....	215
Oil of samphire.....	301
Oil of aniseed as a deodorizer of tersulphide of potassium.....	321
Oil of sassafras, preparation of.....	484
Oil of sassafras, chemistry of.....	491
Oils used in making anilin.....	542
Ointments, preservation of.....	151

Oleate of soda and soap bubbles .....	
Oleic acid.....	508
Oleoresinæ cubebæ.....	210
Olive tree, mannite from the.....	179
Opium, proposed culture of, in America.....	473
Opium, estimation of morphia in.....	512
Orange leaf water as an adulteration of orange flower water.....	301
Orchid tea.....	441
Ostrich, acclimatization of the.....	182
Oxidation of fatty vegetable oils.....	86
Oxidizing disinfectants.....	428
Ozonic decomposition of iodide of potassium ointment.....	298
Pancreatic emulsions.....	143
Paraffin as a preserver of meat .....	341
Paraffin, solubility of.....	471
<i>Parrish, Edward</i> , on a new instrument for rapid evaporation.....	107
Pepper .....	23
Peppermint in Michigan, crop of oil of. ....	68
<i>Perret, M.</i> , on the manufacture of citric acid.....	252
Peruvian cinchonas.....	414
Percolation of powdered colchicum seed.....	119
Percolation of powdered calisaya.....	125
Percolations, general results of.....	127
Pharaoh's serpents.....	61, 92, 99
Pharmacy in Buenos Ayres.....	102
Pharmacy in Spanish America.....	476
Pharmaceutical Congress of Brunswick, international.....	278
Pharmaceutical Congress of Paris, 1867 .....	381
Pharmaceutical herbaria.....	334
Phenic acid, preparation of.....	18
Phosphate of soda, cheap manufacture of.....	184
Physiological exhaustion and vitality of beer yeast .....	161
Physicians' prescriptions—to whom do they belong?.....	204
Physician's visiting list for 1867.....	480
<i>Pile, Dr. W. H.</i> , on the pharmacopœia strength of brandy and whiskey..	324
<i>Pile, Gustavus</i> , on unguentum hydrargyri.....	200
Pimento .....	261
Pith of sassafras .....	483
Plasma, notes on.....	554
Platinum, purification of.....	268
Poisoning by eating the fruit of <i>rhus toxicodendron</i> ...	322
Poisonous calomel.....	88
Potassium, cyanide of.....	316
Powerful microscope.....	565
Prepared liquid glue.....	564
Preparation of liquor bismuthi.....	1
Preparation of carbolic acid.....	18

Preparation of pyrogallie acid, etc.....	20
Preparation of rhubarb in China.....	157
Preparation of iodide of potassium.....	267
Preparation of sulphocyanide of potassium.....	306
Preparation of hydrofluoric acid.....	446
Preservation and dispensing of ointments.....	151
Preservation of meats by paraffin.....	341
Preservation of chloroform.....	473
Preservation of lemons.....	474
Preservation of wood against decay.....	564
Preservative against cholera.....	43
Process for fluid extracts, Dr. Squibb's.....	109
Process for fluid extracts, N. Spencer Thomas'.....	218
Process for rendering wood plastic.....	184
Proceedings of the American Pharmaceutical Association.....	191
<i>Procter, William, Jr.</i> , on liquidambar styraciflua and its balsamic resin..	33
“ “ note on oleoresinæ cubebæ.....	210
“ “ on oil of amber as a remedy for hæmorrhoids.....	217
“ “ on local anæsthesia from the cold of rapid evaporation, and on spray-producing instruments.....	289
“ “ on Aubergier's syrup of lactucarium.....	293
“ “ on Battley's sedative solution of opium.....	304
“ “ on flavoring extracts.....	294
“ “ an essay on sassafras officinale.....	481
Production of high temperatures by means of coal gas and air.....	257
Progress of Agassiz.....	91
Prof. John M. Maisch.....	379
Proposed economy of alcohol in percolation.....	109
Properties of nitroglycerin.....	525
Properties of formic acid.....	331
Propagation of the cattle plague.....	356
Prussic acid, antidote for.....	12
Pumpkin seed, vermifuge properties of.....	253
Purification of platinum.....	268
Pulverization of fluids.....	250
Purgative convolvulacæ.....	206
Pyrogallie acid.....	20
Queries of American Pharmaceutical Association for 1867.....	405
Quinia as an antiseptic.....	45
Quinia, tests for.....	451
Quinia, chlorate of.....	474
Rand's Elements of Medical Chemistry.....	575
<i>Rau, Robert</i> , on senna and its active principle.....	193
<i>Redwood, Prof.</i> , on the preservation of meats by paraffin.....	341
Remedy for epilepsy.....	323
Remedy for hæmorrhoids, oil of amber as a.....	217
Rendering nitro-glycerine non-explosive.....	318

Resin of jalap adulterated with aloes.....	375
Recognition of blood in medico-legal investigations.....	478
Remarks on extracts of meat.....	76
Refracting powers of saline solutions.....	567
Resolutions of the Massachusetts College of Pharmacy on Sunday closing..	89
<i>Reynolds, R., F. C. S.</i> , on cotton-seed oil.....	30
Report on the culture of cinchona at Darjeeling.....	354
Revista Farmaceutica.....	102
Rhœadine .....	568
Rhubarb culture in China.....	153
Rhubarb stalk wine.....	69
<i>Rhus toxicodendron</i> , active principle of.....	4
<i>Rhus toxicodendron</i> , poisoning by eating the fruit of.....	322
Rhigolene or petroleum naphtha.....	363
Richmond Medical Journal.....	93
<i>Row, Frederick, F. C. S.</i> , on the manufacture of citric acid.....	169
Rock salt, Louisiana.....	328
<i>Roussill, M.</i> , on the estimation of morphia in opium.....	512
<i>Roussin, Z.</i> , facts relating to magnesium.....	455
<i>Ruschenberger, Dr. W. S. W.</i> , on oil of aniseed as a deodorizer of tersulphide of potassium.....	321
Saffron, its adulteration with crocus stamens.....	225
Salicin, tests for.....	554
Salt in Idaho and Nevada.....	330
Saltpetre, mountain of.....	87
Samphire, volatile oil of.....	301
<i>Sander, Enno</i> , on nitro-glycerin.....	314
<i>Sanguinaria canadensis</i> .....	496
<i>Sassafras officinale</i> .....	481
<i>Sassafrid</i> .....	489
Scammony.....	209
Schools of Pharmacy.....	479
<i>Schacht, G. F.</i> , notes on plasma.....	554
<i>Schinus molle</i> .....	503
<i>Schlæsing, M. Th.</i> , on the production of high temperatures by means of coal gas and air.....	257
Senna, essay on.....	193
Senna, active principle of.....	374
Sennin.....	198
Sericographis mohitli and its coloring matter.....	302
<i>Shoemaker, Benjamin, Jr.</i> , on <i>Urtica dioica</i> .....	492
<i>Simmonds, P. C.</i> , on Botany Bay or grass tree gum.....	465
<i>Smith, T. &amp; H.</i> , on an antidote at once for prussic acid, antimony and arsenic.....	12
Small-pox remedy.....	308
Soap, alumina in.....	85
<i>Souberian, J. Leon</i> , manufacture of cod-liver oil in Norway.....	215

<i>Sonstadt, M. E.</i> , on the purification of platinum.....	268
Soluble citrate of magnesia .....	300
Soluble Prussian blue.....	505
Solubility of paraffin.....	471
Sponge divers of Calymnos.....	60
Spray-producing instruments.....	289
<i>Squibb, Dr. E. R.</i> , economy of alcohol in percolation in making the fluid extracts.....	109
<i>Squibb, Dr. E. R.</i> , advice on epidemic cholera.....	310
Sophistication of rectified oil of amber.....	146
<i>Stearns, Frederick</i> , on the crop of oil peppermint of Michigan.....	68
“ “ on native wine from rhubarb stalks.....	69
Strychnia, reactions of.....	547
Strychnia in strychnos tieuta.....	506
St. Louis College of Pharmacy.....	574
Sulphocyanide of mercury.....	99
Sulphocyanide of ammonia.....	270
Sulphocyanide of potassium.....	306
Sulphurous acid gas, uses of.....	468
Sulphide of carbon, a new .....	415
<i>Sutton, Francis</i> , on valerianate of iron .....	532
Sunday closing in Boston.....	89
Syrup of lactucarium, Aubergier's.....	293
Syrup of copaiba and syrup of cubebs in diphtheria and croup.....	375
Syrup of pepsin with orange peel.....	376
<i>Tamus communis</i> .....	502
Tar acids, carbolic and creosylic.....	435
<i>Taylor, Samuel</i> , Hints on dispensing.....	347
<i>Taylor, A. B.</i> , on the use of glycerine to prevent the deposition of apotheme.....	325
Tenacity of life in certain seeds.....	318
Tersulphide of potassium deodorized by oil of anise.....	321
<i>Thomas, N. Spencer</i> , on a comparison of Dr. Squibb's and his own pro- cess for fluid extracts .....	218
<i>Thomas, N. Spencer</i> , an extract of hemlock bark.....	214
<i>Thomas, M.</i> , on sericographis mohitli.....	302
<i>Thompson, Wm. Silver</i> , on the preservation and dispensing of ointments...	151
<i>Tilden, William A., F. C. S.</i> , on the active principle of hyoscyamus.....	527
<i>Tomlinson, Charles</i> , why do bees work in the dark.....	239
Toxicodendric acid.....	9
Tratado de Farmacia, notice of Prof. Murray's.....	412
<i>Tuck, John</i> , on Eschwege's patent wood naphtha.....	70
Turbith root.....	209
Unguentum hydrargyri.....	200
Urea in cows' milk.....	377
<i>Urtica dioica</i> .....	492
Uses of sulphurous acid gas.....	468

Vacuum apparatus, automatic.....	129
Valerianate of ammonia, elixir of.....	150
Valerianate of iron.....	532
Valerianate of zinc.....	537
Vanilla, its culture in Mexico.....	38
Vanillin.....	376
Varieties.....	86, 180, 375, 472, 561
Veratrum sabadilla.....	499
Veratrum viride.....	97
Veratrum frigidum.....	500
Veratria, reactions of.....	551
Vermifuge properties of pumpkin seed.....	253
Verrill, A. E., on a new fluid for preserving specimens of natural history..	232
Virtues of borax as a detergent.....	565
<i>Wadgymer Dr. A.</i> , on testing alkaloids.....	447
<i>Walker, John T.</i> , on fluid extract of cinchona.....	411
<i>Warren, T. P. B.</i> , on the effects of soil and culture on the active principles of plants.....	45
Water, camphor.....	166
Wax, yellow, in cerates.....	337
<i>Weil, M. Frederick</i> , on a new process for plating metals.....	173
<i>Welwitsch, Dr.</i> , observations on the origin and distribution of copal in Angola.....	439
Whiskey, pharmacopœia strength of.....	324
White copal ( <i>heliocarpus copallifera</i> ).....	503
<i>Whitney, Prof. J. D.</i> , on borax in California.....	235
<i>Wildman, Dr. E.</i> , on dentist's hard rubber.....	185
Wine, essence of.....	168
Why do bees work in the dark.....	239
Wholesale lead poisoning.....	366
Wood naphtha, Eschwege's patent.....	70
Wood, spirits of turpentine, wood spirit, &c., obtained from pine.....	530
<i>Young, W.</i> , on the detection of methylic alcohol in alcoholic and ethereal liquids.....	58
Yellow wax, instead of white in cerates.....	337
Zinc, valerianate of.....	537





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